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# Chevrolet Wins at Indianapolis in American Made Monroe

## No stops except for gas and oil were made by the winner in the three-liter sweepstakes. Thomas, in a Ballot, took second, with Milton and Murphy, in Duesenbergs, capturing third and fourth. Time was slightly slower than record for 300 cu. in. cars.

By J. Edward Schipper

INDIANAPOLIS, May 31.

GASTON CHEVROLET, driving a Monroe, won the 500-mile speedway race here to-day at a speed rate of 88.16 miles per hour. Chevrolet, in his American designed car that was built at Indianapolis, won by his ability to judge the winning pace and by the ability of his car to go the distance without a tire change. He made but two stops, the first for gasoline and oil and the second, likewise, for gas. Chevrolet's time was 5 hr. 40 min. 16.14 sec.

Driven under the new rules limiting piston displacement to 183 cu. in. and weight to 1800 lb., the speed of the winning car was faster than that of the 1919 victor and within close limits of the 500-mile record made by De Palma in 1915, in both of which races the cylinder content was 300 cu. in. or less. De Palma's record of 1915 was 89.84 m.p.h., only 1.68 m.p.h. more than Chevrolet's, and his elapsed time was 5 hr. 33 min. 55.51 sec.

Rene Thomas, in a French Ballot, was second in to-day's event, with an average speed of 87.47 miles per hour. Thomas Milton, driving a Duesenberg, was third, at 86.52 miles per hour, and Jimmy Murphy, also driving a Duesenberg, was fourth, at a speed rate of 85.10.

Ralph De Palma was in the lead at the 467th mile, but was delayed by fire and faulty plugs for sufficient time to be put back to fifth place. His Ballot had plenty of speed and, in fact, was probably the fastest car in the race, as is shown by the fact that he turned some exceptionally fast laps in the earlier parts of the contest.

**The Winners at Indianapolis**

| Driver | Car | Elapsed Time | Miles per hour |
|---|---|---|---|
| 1—G. Chevrolet | Monroe | 5:40:16.14 | 88.16 |
| 2—Thomas | Ballot | 5:43:2.29 | 87.47 |
| 3—Milton | Duesenberg | 5:46:43.38 | 86.52 |
| 4—Murphy | Duesenberg | 5:52:31.37 | 85.10 |
| 5—De Palma | Ballot | 6:05:19.15 | 82.12 |
| 6—Hearne | Duesenberg | 6:14:19.16 | 80.15 |
| 7—Jean Chassagne | Ballot | 6:15:16.68 | 79.94 |
| 8—Klein | Frontenac | 6:21:41.55 | 78.60 |
| 9—Mulford | Mulford Special | 7:19:3.75 | 68.33 |
| 10—Anderson | Revere | 7:21:40.8 | 67.93 |

No one was killed and the only driver hurt was Joe Boyer in a Frontenac. His injuries were trivial. There were several narrow escapes, however, and the drivers were saved only by their steady nerves. The result depended more than ever on the daring of the men at the wheels. With the lighter cars they were able to take the curves at full speed.

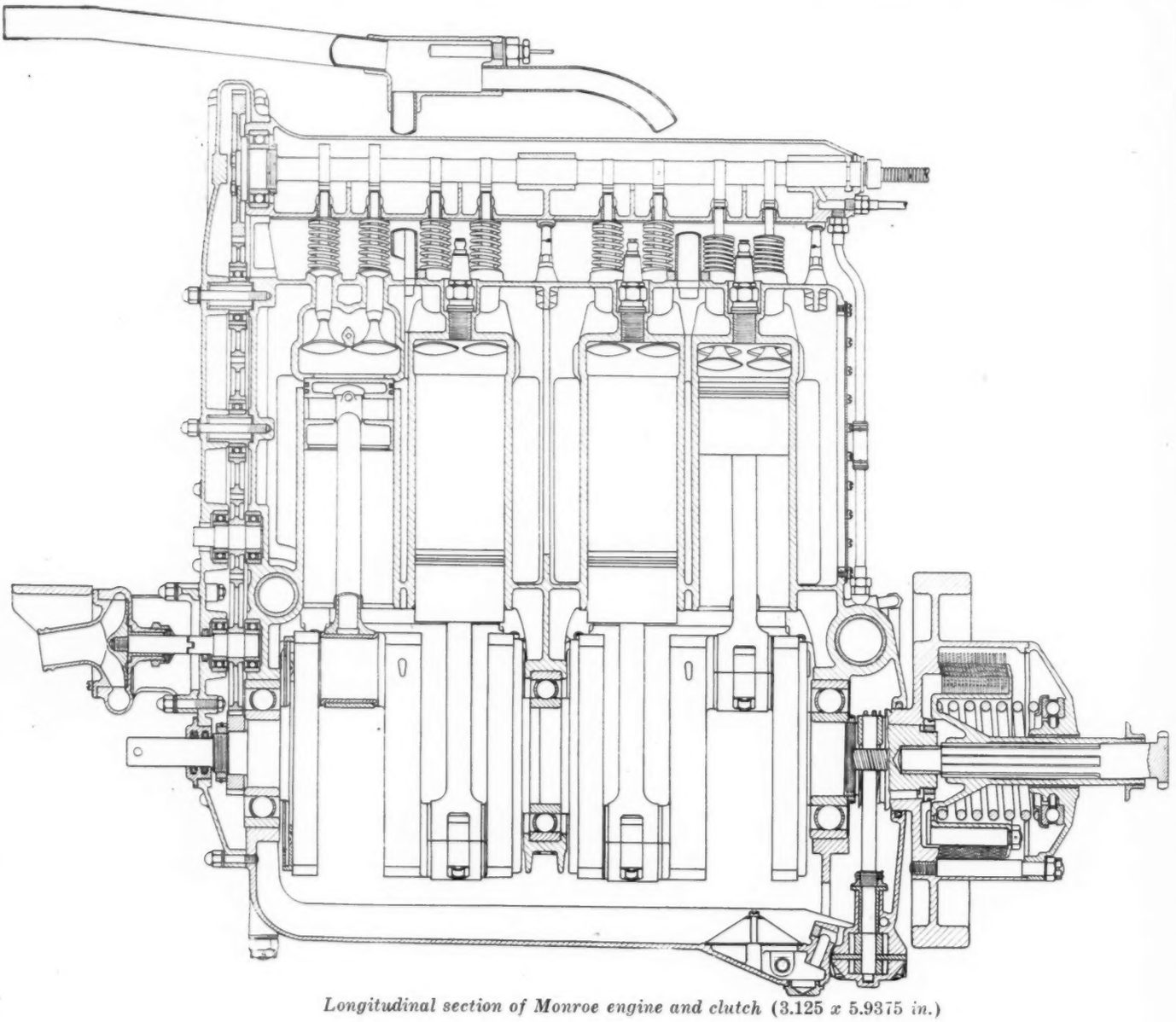
It is probable, even better time could have been made had the leaders at various stages of the race been forced to drive to the limit. The lighter cars, untried on any track and with no real record of past performance behind them, stood the strain remarkably well, and there were fewer stops at the pit than there ever have been at an Indianapolis race. With to-day's experience there is every reason to expect an even better showing next year.

The race was one of the best contested in the history of the Speedway, more than 400 miles being run at a speed higher than 90 m.p.h. The fact that every lap carried a prize of $100 was a factor in causing the drivers to set a fast pace early in the race. Boyer and De Palma got practically all of this money, the Frontenac, Monroe and Ballot cars easily having the best of it in speed. The much-heralded Peugeots, over which the French team had drawn a close veil of secrecy, failed to show any great amount of speed or staying power. All three of them went out in respectively 15, 63 and 138 laps, while the Baby Peugeot, driven by Howard, which is of the old type and not one of the new five-valve jobs, managed to cover the entire distance, but outside the money.

Ralph De Palma, who seemed to have the fastest car, was unfortunate. He changed a plug at the starting line and his engine hood was still up when Barney Oldfield, in his Marmon roadster, started the pacing lap. De Palma lost about a quarter of the paced lap and then, as he crossed the wire on the start of the first lap, had to draw up in front of his pit for a right rear tire. This put him 52 sec. behind the leader, which time he made up in about 34 laps. From this point, the closest brush of the race, lasting for about 60 laps, occurred between Boyer and De Palma.

There were many stirring battles for the lead, for the drivers were spurred on by a prize of $100 for the men ahead at the end of each lap. These daredevil bursts of speed brought the great throngs to their feet with wild cheers. The sweepstakes proved there is no lack of interest in automobile racing, for the crowd was estimated at 125,000, the largest that ever saw a race on the speedway.

It seemed that De Palma was the hero of the majority



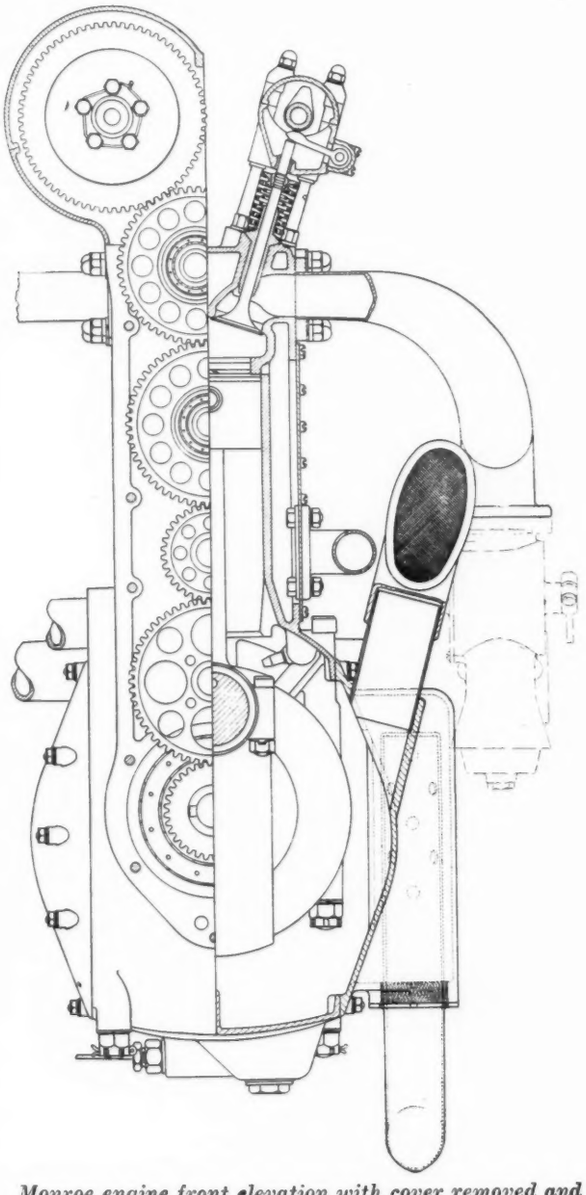
*Longitudinal section of Monroe engine and clutch* (3.125 *x* 5.9375 *in.*)

even though he was mounted in a Ballot, a French car. His performance was the most spectacular of the day and once again he failed of victory when it was almost within his grasp. Seven years ago to-day he led the field for 498 miles; then his car caught fire and was burned.

De Palma made four pit stops in his Ballot, changing four tires and his spark plugs. He was forced to make a trip on foot to the pits for gasoline, which cost him the lead in the race at the 467th mile mark.

The cars developed characteristic weaknesses. In the Frontenacs and Monroes, these were in the steering knuckles and arms and, in the Duesenbergs, in the valves and rockers. Five out of seven of the Chevrolet cars, carrying the Monroe and Frontenac colors, broke their steering arms. Only the winner and Thomas, who finished second, escaped this difficulty. Louis Chevrolet's car hit the wall and eventually had to get out of the race as a result. Fatigue of the metal in the steering arm seems to have caused this, the vibrations on the brick track being responsible for developing the weakness.

The broken valve springs, guides and spring retainers were peculiar to the Duesenbergs, as was the steering gear trouble to the Chevrolet products. Tom Milton, who finished third, ran a great part of his race with a broken valve spring but did not come into the pits with it.



*Monroe engine front elevation with cover removed and section through cylinder*

Tom Rooney, in the Revere, equipped with the same type of engine, came into the pits twice with broken valve mechanism, having to overhaul the entire system and even ream out the guide bushing. It is possible that these bushings did not have sufficient clearance and froze. Eddie O'Donnell, in his Duesenberg, would have finished well up had it not been for the same trouble; the valve on his car dropping down into the engine, putting him out of the race on the 147th lap. Hearne, whose Duesenberg finished sixth, did not have this trouble.

While the showing of the Duesenbergs was not as spectacular as that of some of the other teams, they made a remarkable fine team record. Tommy Milton finished third. Jimmy Murphy was fourth; Eddie Hearne was sixth. Eddie O'Donnell, the fourth Duesenberg color bearer, was out in the 147th lap when a valve dropped into a cylinder. None of the Duesenbergs stopped for repairs.

Only two of the six Monroe-Frontenac entries finished within the money, although Joe Boyer gave a splendid exhibition of driving and held the lead in his Frontenac for many miles. His battle with De Palma for the lead was the most thrilling incident of the race. They ran neck and neck lap after lap, only a few feet apart. He won $9,500 in lap prizes. He was relieved by Ira Vail in the 150th lap, but went back on the track after a brief rest. In the 192nd lap he struck the retaining wall when he skidded trying to avoid running into Art Klein, who had relieved Joe Thomas and whose Monroe car also had skidded. Klein finished eighth in an average of 78.60 m.p.h. Louis Chevrolet, in a Monroe, broke his steering gear in the 62nd lap and wrenched his back. He was relieved by Salvatore Barbarino after the car had been repaired. It went out in the 97th lap because the repairs were not satisfactory.

There were 34 tire changes during the race—right rears 16, right fronts 11, left rears five, and left fronts two. De Palma, in his Ballot, with five, had the greater number, three of these being left rears. Murphy, in a Duesenberg, and Houpt, in a Meteor, each had four changes.

The Gregoires were a disappointment. They seemed to have trouble in the valve drive. Only one qualified and that by a narrow margin. The cars are not suited for the track, being high, not holding the track well, and with difficulties in the rather complex valve action. Porporato was finally flagged off the track, not being able to hold the pace. He made two stops to repair the valve gear. Mulford, in the Mulford Special, was slow, but made only two stops, one for gas, oil and water, the other to look after a universal joint. He was unable to get better than ninth.

Altogether there were 60 pit stops, which is an average of little more than two per car for 25 starters. This is a good showing, when it is considered that this is a new displacement class. The difficulties encountered were minor and can be easily rectified.

Record of pit stops follows:

De Palma, Ballot, five stops, tires, gas, oil, water, ignition.

L. Chevrolet, Monroe, five stops, broken steering lever, repair tie rod, gasoline, oil, tires, tighten shock absorber, out 97 laps.

G. Chevrolet, Monroe, two stops, gas and oil.

Boyd, Richards, five, plugs, magneto, tire, gas, oil, water.

Mulford, Mulford Special, two, gas, oil, water repair universal.

Haupt, Meteor, four, gas, oil, broken steering arm, tires, broken springs caused him to be ruled off.

# The Racers and Their Equipment

| Driver | Car | Carbureter | Ignition | Plugs | Tires | Size | Differential | Wheels |
|---|---|---|---|---|---|---|---|---|
| De Palma | Ballot | Miller | Magneto | | | 33x5 | Yes | Whitworth |
| Chassagne | " | Claudel | " | | | " | " | Rudge |
| R. Thomas | " | " | " | | | " | " | " |
| L. Chevrolet | Monroe | Miller | Delco | Mosler | Oldfield | Front, 32x4 Rear, 33x4½ | No | " |
| G. Chevrolet | " | " | " | " | " | " | " | " |
| Sarles | " | " | " | " | " | " | " | " |
| Thomas | " | " | " | " | " | " | " | " |
| Boyer | Frontenac | " | " | " | " | " | " | " |
| Hill | " | " | " | " | " | " | " | " |
| Klein | " | " | " | " | " | " | " | " |
| Howard | Baby Peugeot | " | Magneto | " | Goodyear | 32x4½ 33x5 | Yes | " |
| Goux | Peugeot | | | | | | | |
| Wilcox | " | | | | | | | |
| Baillot | " | | | | | | | |
| Porporato | Gregoire | Zenith | Salmson Magneto | K. L. G. | Palmer | 35x5 | Yes | " |
| Scales | " | " | " " | " | " | " | No | " |
| Murphy | Duesenberg | Miller | Delco | A.C. | Goodyear | 32x4½ 33x5 | Yes | " |
| Milton | " | " | " | " | " | " | " | " |
| O'Donnell | " | " | " | " | " | " | " | " |
| Hearne | " | " | " | " | " | " | " | " |
| Rooney | Revere | " | " | " | " | 33x5 | " | " |
| Mulford | Mulford Special | " | " | B. G. | Braender | 32x4½ | " | " |
| Boyd | Richards | " | Bosch | A. C. | Goodyear | 32x4½ 33x5 | " | " |
| Haupt | Meteor | " | Delco | " | Mason | 32x4½ 33x5 | " | " |

Sarles, Monroe, two stops, left front tire and went off track with broken steering gear.

Boyer, Frontenac, five stops, gas, oil, tires, distributor lever, springs, broken steering arm, replaced knuckle. Out on 192 laps.

Hill, Frontenac, two, oil and out broken steering knuckle, 125 laps.

Klein, Frontenac, one, broken steering, arm, out 41 laps.

Howard, Peugeot, six stops, plugs, cleaned gas line, water, gas, overhauled carbureter.

Milton, Duesenberg, one, tires, gas and oil.

Murphy, Duesenberg, two, tires and gas.

Rooney, Revere, four, broken valve springs, broken rocker roller pin, tires and gasoline.

Goux, Peugeot Special, two, gas and oil, out valve trouble 15 laps.

Wilcox, Peugeot, out 63 laps, engine trouble.

Porporato, Gregoire, three, water on brakes, adjusted valves, flagged off, slow 22 laps.

Thomas, Ballot, two, tires, gas and to adjust breaker timing on magneto.

Chassagne, Ballot, three, tires, gas and broken tie rod.

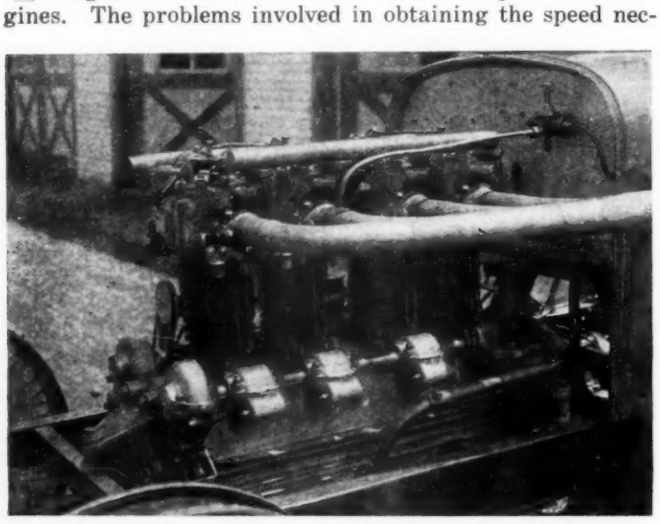
Thomas, Monroe, four, oil, leak gas, oil, one tire.

O'Donnell, Duesenberg, three, gas, broken valve spring, broken valve, out 147 laps.

Hearne, Duesenberg, three, tires, gas and water.

# Engineering Notes on the Racing Cars

THIS year's race is of extreme interest to automobile engineers because of the smaller displacement engines. The problems involved in obtaining the speed necessary to contend in this race are essentially those of breathing capacity. While the displacement—per stroke—limit was little more than half the limit of last year, the displacement per unit of time was substantially the cause.



*The Gregoire engine*

To express it differently, were displacements calculated on a basis of cubic inches per mile traveled or per hour, it would be found that little difference exists, because, while the cylinders are smaller, they are filled more often and—what is extremely important—more completely than the previous larger racing engines.

While the displacement is coming down, the r.p.m. has been going up. Furthermore, superior manifolding and valve proportioning and actuation have had the effect of increasing the volumetric efficiency. The three, four and even five valve per cylinder engine is now the rule and not the exception, because it is necessary to handle the maximum volume of gas in the minimum time in order to get the utmost out of the limited displacement.

When we get down to three liters or 183 cu. in., we are using a small engine. There is no longer the margin to play with and extremely high mean effective pressures are being secured with the new speed engines. The problem of gear ratio enters strongly into the matter, and it is

quite apparent that improvements in this respect could have been made on some of the Indianapolis racers. It is not easy to determine the proper ratio and longer experimentation than was available for most of the cars is necessary. Besides the wind resistance factors, which do not enter in the block test, the Indianapolis track differs from other speedways in that the banking is not steep enough for speeds over 90 m.p.h., and the result is that the driver either has to cut out on the turns or slide his rear wheels in making them. A car with the proper gear ratio for the Indianapolis track, the way it is generally driven, must have a ratio sufficient to provide sufficient speed on the straight-aways and at the same time acceleration enough to get out of the turns so that little or no loss occurs due to cutting out.

Before the race, there is always talk among the drivers of taking the turns wide open, but after the race is under way none do this consistently, except when hard pressed, or a stiff brush for a money prize. In fact, unless it is done exactly right, almost as much is lost as is gained, because of a considerable loss of traction, increased tire stressing and increased distance traveled due to taking less desirable location on the track. A combination of proper gear ratio and track knowledge is highly important in making good time on this particular speedway.

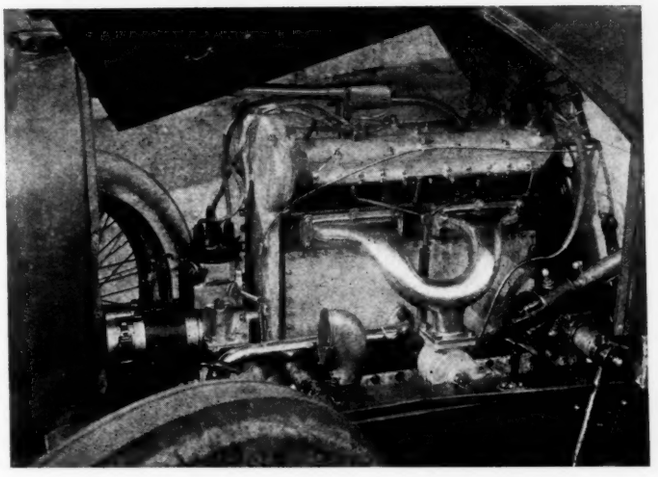
The valve arrangement on this year's racing cars make an interesting study. Duesenberg uses three per cylinder, overhead in these eight-in-a-row jobs and not side action, as on his eight and sixteen valve fours. Chevrolet, on the identical Monroes and Frontenacs, uses four. A sectional drawing of this interesting engine is shown herewith. The valves are driven by a train of gears extending up the front end of the engine and all the auxiliary drives are also taken off these gears. The new Gregoires have four valves located in a peculiar manner in a sort of square layout with a valve at each corner and a spark plug in the center. This gives a rather odd valve drive but, while it looks complicated, the car is unusually smooth sounding.

The new Peugeots are the mystery cars as far as technical data is concerned. They hold the record for valves, having five per cylinder, but are so closely guarded that little or nothing is known about them. A good chance of comparison is offered between the new jobs piloted by Goux, Wilcox, Wilson and Boillot, and the older type known as the Baby Peugeot, piloted by Howard. The latter is the familiar Peugeot design which has made good so consistently in previous races. The Ballot small displacement cars are replicas of the larger designs.

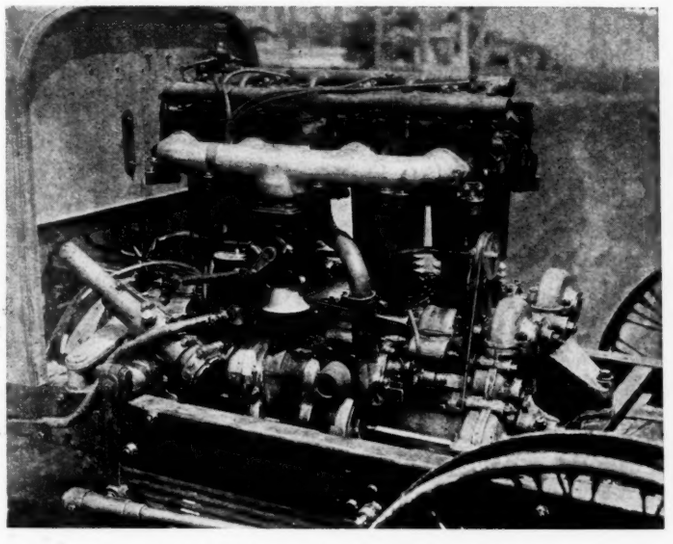
Inability to put through shipments of parts and delays due to the present shipping situation have caused inconvenience to several of the racers and greatly cut into the time they should have had to get ready. In spite of this handicap, the number of entries was surprising when it is remembered that entirely new cars had to be designed and built on account of the reduced displacement. The new cars have some original features which are very interesting.

Mulford has fitted oil radiator tubes in front of his radiator to keep the oil in good condition. The Gregoires have arrangements for water cooling their bearings if so desired but are not connecting such a system for this race. They also can introduce water immediately around the plugs if so desired. The ingenuity of the French designers is well exemplified in these cars.

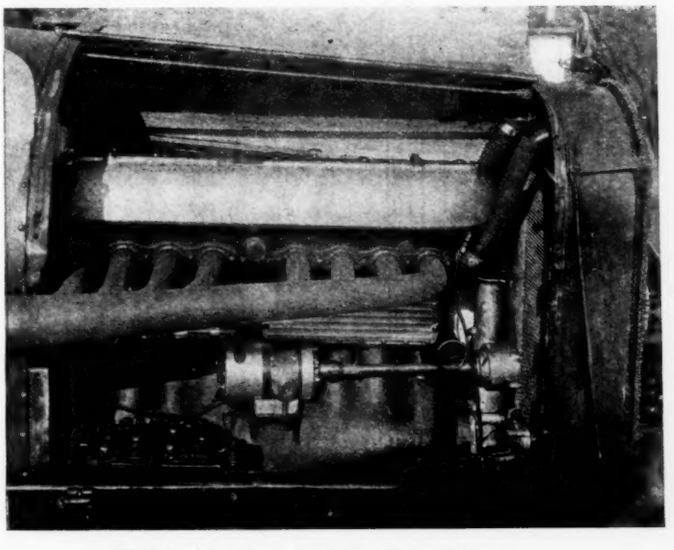
The increasing popularity of the 32 x 4½-in. rims with 33 x 5-in. oversize rear tires is interesting. This useful size seems to fit in with racing practice as well as with passenger car design. It will probably become even more popular as a result of the performances on the track under the most adverse circumstances.



*A close-up view of the winning Monroe engine.*



*Right side of the Gregoire engine.*



*Right side of one of the Duesenbergs.*

# European Carbureter Is Being Manufactured in This Country

**Manufacture in America of the Claudel carbureter was begun recently. A feature of this foreign product is that variations in the power or consumption curve can be effected by changing the size and position of the compensating holes in the diffuser walls. This is a brief description of it.**

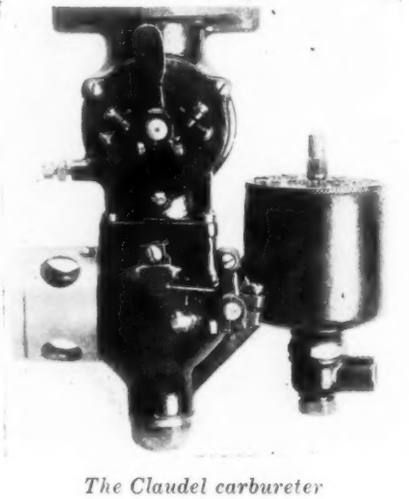
THE Claudel carbureter, which is well-known in Europe and in the past has been imported into this country to a limited extent, is now being manufactured here by the Claudel Carbureter Co. This carbureter is of the type without moving parts, also called the plain tube type. The method of compensation used in this device for mixture variation with variation in suction, was patented by Charles Henri Claudel in 1903 but has since been refined in detail.

The Claudel is really a combination of two jets, one of which, the main jet, has a constant rate of flow, while the other, which is in the form of a series of nozzle holes, has a rate of delivery that varies with the suction. Fig. 1 indicates the fuel level when the carbureter is at rest. Fuel from the float chamber flows through the main jet into the diffuser, then through the compensating holes into the reservoir or diffuser bore. It also flows through the idling jet into the idling tube, the level in the three tubes being the same as that in the float chamber.

Air enters the air tube of the diffuser column, passes up this outer sleeve and over the top of the gasoline guard tube, which prevents the fuel from overflowing. As the throttle is opened and the suction in the diffuser increases, thereby lowering the liquid level in the diffuser bore, a series of air bleeder or compensating holes are successively uncovered. Through these holes the air rushes into the ascending column of gas vapor and out the nozzle holes at the top of the diffuser in a finely broken-up gasoline emulsion. The higher the suction acting upon the diffuser, the lower will be the level of gasoline within it, and, therefore, more of the compensating holes will be uncovered, permitting a greater dilution of the mixture. At the higher speeds the diffuser is practically empty.

Variations in the power or consumption curve can be effected by changing the size and position of the compensating holes in the diffuser wall. For example, if the mixture curve shows a rich mixture at an engine speed of 1000 r.p.m., the holes at the corresponding level of the gasoline in the diffuser can be enlarged, thinning out the mixture and bringing it to the point desired.

The idling device is incorporated in a central tube projecting up into the depression of the barrel throttle, where a strong pull is exerted on the idling jet for low-speed action. The barrel throttle is slotted to pass around the idling jet, and the only adjustment on the carbureter is a screw extending into the air space to partially block off the area of this slot as desired. Screwing it in lessens the air area and enriches the idling mixture; screwing it out



*The Claudel carbureter*

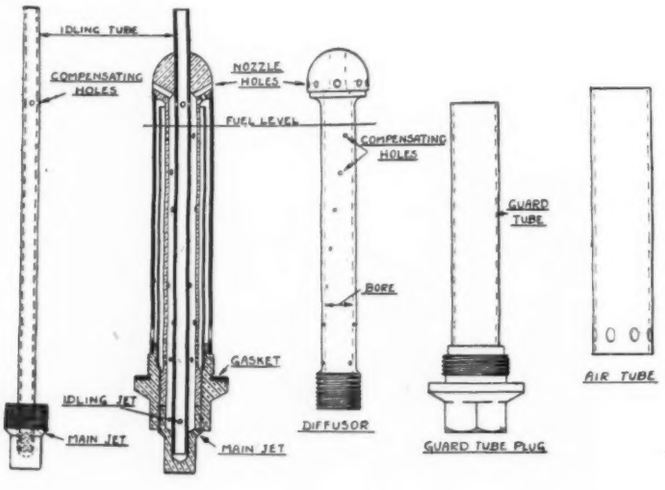



*Fig.* 1

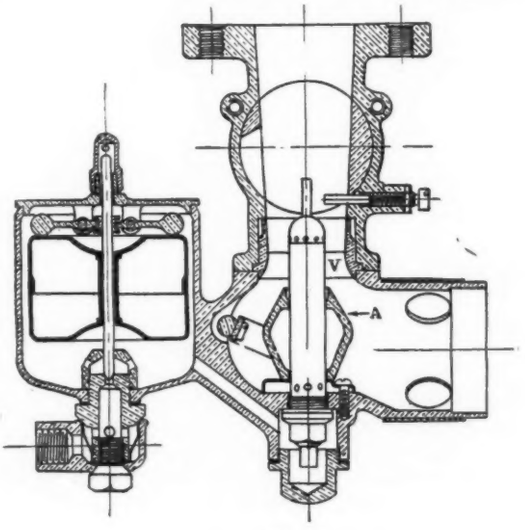



*Fig.* 2

makes the mixture leaner by decreasing the suction.

In the American type of Claudel shown in Fig. 2, a means has been incorporated for strangling the air, in the form of a sliding air cone controlled from the dash. The streamline air cone, concentric with the diffuser, may be raised into contact with the venturi, shutting off the air supply and putting the full suction on the diffuser. Diffuser discharge then begins almost instantaneously.

Referring again to Fig. 2, the sliding cone *A*, in its closed or strangling position, fits snugly into the venturi entry *V*. The streamline shape of the cone is intended to center and steady the air stream so that it passes the nozzle holes of the diffuser at high and uniform velocity. In its lowest position the cone is said to offer no restriction to the air.

In warming up a cold engine, when a richer mixure is necessary, the cone *A* may be dropped slightly, thus forming a variable venturi. With the cone in this position the car may be started while the engine is still cold.

An advantage is claimed for the Claudel cone over the common butterfly choke valve in that the amount of air between the nozzle and the choker valve is much smaller, and consequently the response is quicker.

On the Claudel airplane carbureter the air cone is used as an altitude corrector. Owing to the lesser density of air at high altitudes, it is necessary to reduce the supply of gasoline, as compared with operation at ground level.

In the airplane type of carbureter, a venturi is installed several sizes larger than the capacity required at ground level. The streamline cone is then raised and adjusted in the position of best performance at ground level. When the plane reaches an altitude of several thousand feet, the pilot gradually lowers the cone as he ascends, enlarging the venturi, decreasing the suction on the diffuser and reducing its delivery. Full power is thus obtained without waste of fuel.

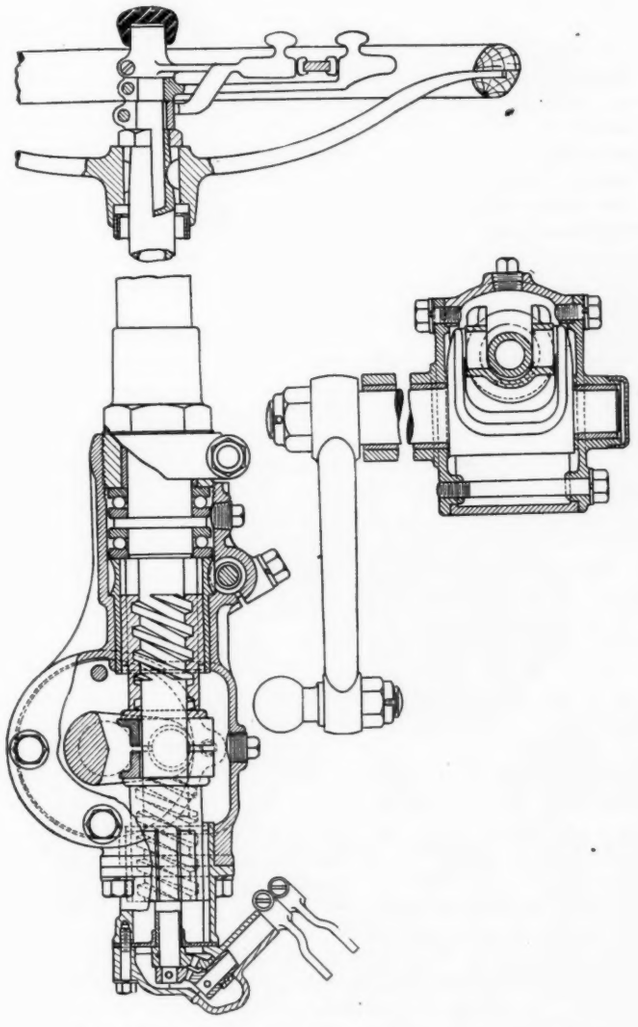
The Claudel is manufactured in a number of standard S. A. E. vertical sizes. A horizontal model will be announced later. Special models, including airplane and duplex designs, are built to order.

# Adjustable Steering Gear

MOVEMENT of the steering arm shaft is produced by a sliding block between two threaded sleeves, as indicated in the right hand portion of the illustration. These sleeves are caused to slide up and down by two left hand screw threads on the steering shaft. One of these threaded sleeves can be adjusted to approach the sliding block and thus compensate for wear. It is this adjustment, regulated by merely turning the shaft of a small worm outside the casing, that constitutes one of the features of the apparatus. The manufacturers are the Steering Gear and Parts Co. and the device is known as the Carrico steering gear.

The control shafts pass centrally through the hollow sleeving shaft and carry bevel gear sectors at their lower end, meshing with other bevel sectors on the short concentric vertical shafts supported in a bracket secured to the bottom of the steering gear housing. The control levers move on the inside and outside of a smooth stationary sector and are held in place by friction shoes.

Among the claims made for this steering device is that it is semi-reversible, yielding if a wheel hits a curb, and yet is sufficiently rigid to eliminate road shocks which otherwise might be transmitted through the steering wheel to the arm of the driver. Production is for both commercial and pleasure cars. The type shown is for 1, 1½ and 2-ton trucks.



*The Carrico steering gear. This gear is of the semi-reversible type even though a worm and wheel are used*

## Motor Transport in Germany

ON December 31 last the activities of the district transport boards in Germany ceased, and as a result the Saxon Government has taken steps to form a company to conduct a road transport service with Government capital.

The truck parks of Chemnitz and Dresden, established during the war, will be taken over, and with them, some 240 trucks. The State will be responsible for three-fifths of the capital necessary, the remainder being provided by the various towns, regional boards, etc. For the time being the State will finance the undertaking. The city of Dresden has approved a levy of one mark per head of the population for the new "company." The company will at present carry on a hire business, thus reducing the capital required immediately to 2,000,000 marks. Later on transport services will be established and also passenger traffic.

# Analysis of German Trucks by the Motor Transport Corps

**This article continues the report on the trucks surrendered to the A. E. F. under the terms of the armistice. The results of the investigations and tests are being made public as rapidly as they are completed for each truck.**

By W. E. Noakes

## The Arbenz

THE Arbenz engine is four-cylinder, 4 1/8 x 6 in. bore and stroke, 4-point suspension, suspension by upper half of crankcase.

Cylinders are cast in pairs and held down by six 7/16-in. studs. Combustion chamber is a flat type, with intake entering on right-hand side, and exhaust on the left-hand side. Single port for two valves used on both intake and exhaust—the ports and passages on both sides are clean and sandblasted. Cylinder walls are 3/8 in. thick, with chamfer at bottom of cylinder; also two slots, 1 5/8 in. wide, set on center 180 deg. apart, allowing for connecting rod clearance. Cylinder water cover is cast integral with cylinder. The water area in cylinder block is very small. Water enters on intake side, located on the water jacket of cylinder and circulates partly around cylinder walls as walls are cast together in center of block. The water circulates around valve chambers, rising to center of cylinder and passing out on top. Valve guides are steel, machined all over and screwed into cylinders. The body of valve guide has a hexagon boss with a machined surface for retaining valve spring. Priming cups are mounted in center of each cylinder, while spark plugs are over intake valves. Exhaust manifold is of cast iron, having two ports with a hot-air stove attachment mounted between ports. Intake manifold is of two castings, made of aluminum. The lower casting contains both the governor control, butterfly valve, and air-intake valve, both being mounted on one shaft, but operated by different levers.

Flywheel is cast iron. The rim is cast integral with five fan-shaped fins. The diameter is 17 1/4 in., width 4 in., depth of rim is 1 1/2 in. The inner hub, which is 8 in. in diameter is machined and slotted for disk clutch.

Upper half of crankcase is of cast iron with heavy walls carrying heavy supporting arms. Inside of crankcase is very clean. Bearing bosses, which hold ball bearings, take all the strain and support of bearings and rigidly support the crankcase and upper face for holding cylinder blocks. The lower half of crankcase is of cast aluminum with cast-in oil troughs, which take all the support, as there are no ribs or webs in case. A cast-in oil lead, which runs the full length of oil pan is connected to oil troughs through oil holes drilled in lead. The oil pan, although 8 in. wide, has deep oil reservoir carrying approximately 2 gal. of oil.

Crankshaft is drop-forged, being semi-machine finished, with no oil holes or oil grooves for bearings. Short cheeks are 15/16 in. thick; long cheeks 1 in. thick, and both 2 3/8 in. wide. Both long and short cheeks have ends chamfered with small fillets on top. The front short cheek of center bearing is milled down on upper end to allow center ball bearing to pass around throw of crankshaft. The main bearings of crankshaft are ball bearings. The front bearing is 4 11/16 in. in diameter, and holds eleven 3/4-in. steel balls. The center bearing is 6 in. in diameter, with eighteen 3/4-in. steel balls. Rear bearing is 6 1/4 in. in diameter, having twelve 1-in. steel balls. The crankshaft thrust is stationed on the rear bearing through a cast iron retainer mounted over the rear bearing; the rear bearing being a single row, annular type, pressed on crankshaft. The center bearing is mounted on crankshaft bearing, 3 1/2 in. in diameter, and held on one side by a steel forged block, cut in half, bolted together by two 5/16-in. bolts, while the other side is held in place by cheek of short arm. This bearing is not mounted in center of crankpin, and has a steel ring 8 5/16 in. in diameter by 1 3/8 in. wide pressed over outer race. The front bearing is mounted on a machined sleeve, and pressed on front bearing of crankshaft. The crankcase is machined so that bearings when assembled to crankshaft can be pressed in place. The retainer on the rear bearing is bolted to rear face of crankcase, thereby holding crankshaft and bearings in place. No bearing caps used. The flywheel is pressed on small hub at rear of crankshaft and held by straight key and nut. The crankshaft gear is pressed on front of crankshaft and held in place by a straight key.

### Connecting Rods and Bearings

Connecting rods are offset, drop-forged, I-beam type, semi-finished, with caps held in place by four 3/8-in. bolts. No shims used, as joints are lapped. Upper end of rod is drilled and countersunk through to piston pin for a 3/16-in. oil hole. On upper half of big end there are two oil holes, one on each side of I section of rod. An oil scupper, made of steel tubing 3/4 in. long, with an oval-shaped opening 5/8 in. long by 3/8 in. wide, is soldered in center of lower half of big end.

Bearings are babbitt lined, and bronze backed, with babbitt held in bronze back by two V-shaped recesses, one on each side of bearing. This locks the babbitt in bronze backing. Bearings are 1 7/8 in. in diameter and 3 1/4 in. long. On inside of bearing of upper half there are two slightly curved oil grooves, each connecting oil hole, and having leads running to cut-in bearing, while the lower half has X-shaped oil groove, having 3/8-in. oil hole in center for oil scupper. Small end bushing is a bronze

sleeve, pressed in place, a single oil groove connecting to oil hole in top of bearing.

### Pistons and Pins

Pistons are cast iron with dome head, having a cross-shaped rib on inside of head for support. Length, 5 in., having three ¼-in., lapped-joint hammered, concentric compression rings. No oil holes or oil grooves, piston having 1⅝-in. recess, approximately 1/64-in. under diameter of piston, that is semi-finished for retaining oil for lubricating piston. Skirt is machined on the inside, thickness being $\frac{3}{32}$ in. with a $\frac{3}{16}$ x ⅜ in. reinforced rib on bottom. Piston pin is of steel tubing, $\frac{25}{32}$ in. in diameter, hardened and ground, held in place by a square-head set screw with tapered shank that passes through piston pin boss and into piston pin. Screw is locked by cotter pin. Piston skirt is ground.

Timing gears are of the spur type, soft steel forgings. Crankshaft gear is 4 in. in diameter, 33 teeth, ¼ in. deep, ¼ in. at base of tooth, and 1-in. face. This gear has two ½-in. cap holes, spaced 180 deg. apart, used for gear puller. The crankshaft gear is pressed on to crankshaft, and held in place by a straight key. Both intake and exhaust camshaft gears are pinned and keyed to camshafts. A ¼-in. fiber plate, extending from hub to rim, is bolted on each side of camshaft gear to lessen the noise, which is caused by meshing of steel gears when in operation. On each camshaft gear there are two ½-in. tapped holes used for gear puller. The water pump and magneto gears are mounted on shafts, each with two bearings; rear bearing centered in steel retainer of gear case, while the front is centered in retainers on front gearcase cover.

### Valves, Valve Tappets and Guides

Valves are of the mushroom type, with dome head, having a ¼-in. tapped hole in center. Diameter of head 1¾ in., thickness of head ¼ in., with 45-deg. chamfer, having a ⅛-in. seat; length of stem, 6½ in.; diameter of stem, ⅜ in. The valve head is exceptionally heavy, having a large, tapered shank, which extends 1 in. under head of valve. Valve head is evidently welded to stem and machined. The valve springs are held in place by machined caps and straight keys, 1¼ x ⅛ in., which fit into elongated holes on valve stems and are locked in grooves of caps. Valve caps are of steel, machined all over, having a hexagon head. The intake valve cap is the same as exhaust valve cap, with the exception of having a metric cap hole for spark plug. No protection is afforded for valves or valve springs.

Valve tappets are of the roller type, with rollers mounted in steel stems, and extra long adjusting screws, having ½ x ⅜-in. heads on top of screws, screwed into stems and locked in place by jam nuts. Diameter of valve tappet is ¾ in. and 4 in. long. Tappet guides are of cast iron, machined all over, with a two-bolt flange cast integral with body used for holding valve tappet assembly on upper face of crankcase. A large oil recess is machined on inside of body, having an oil groove cut from recess to bottom of body.

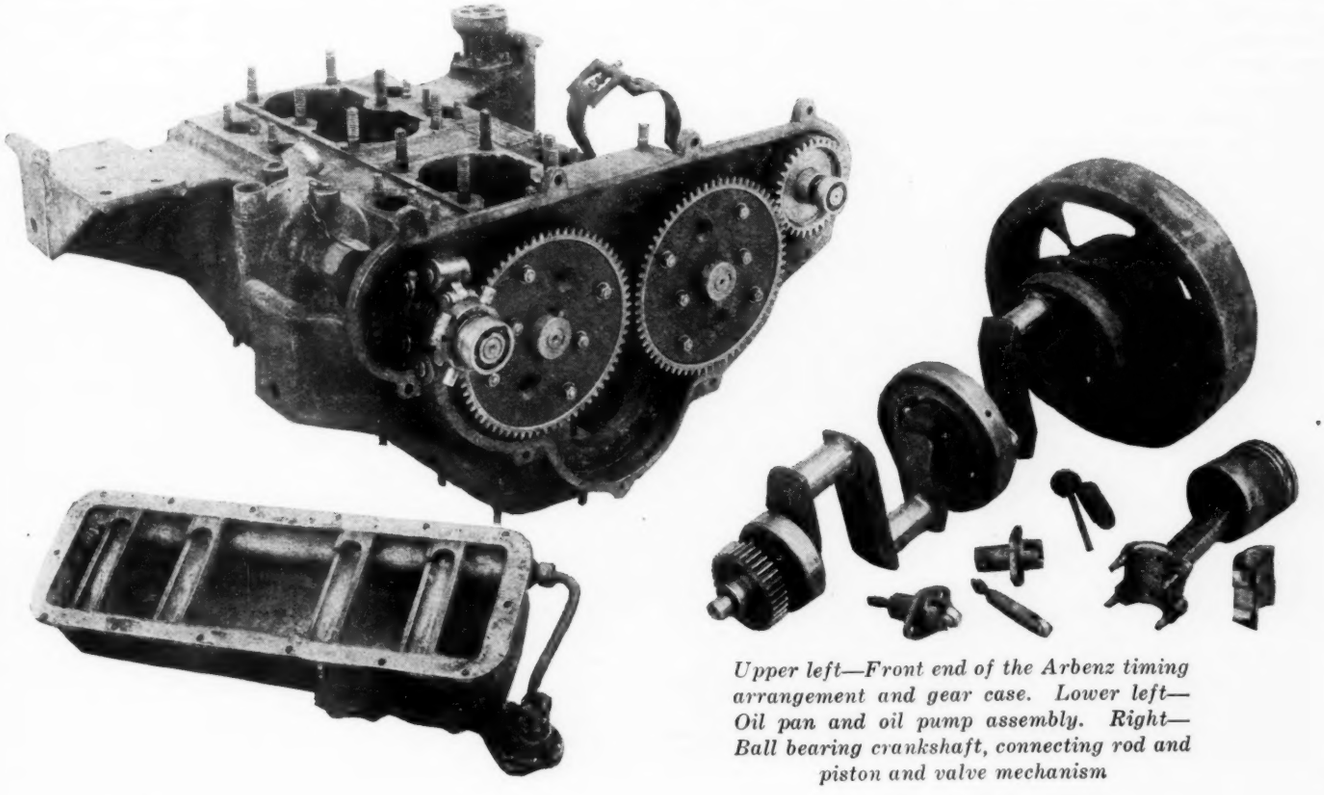
### Camshafts and Bearings

Camshafts are of steel forgings, hardened and ground all over, with cams forged separately and pinned to shaft by tow taper pins, one on each side of cam at right angles of each other, having a cotter pin on the small end of the pin. Diameter of shaft, ⅞ in. Cam radius, 1¼ in. in diameter; width of cam, $\frac{9}{16}$ in.; overall length of cam, 2½ in., while the lift is $\frac{11}{32}$ in. A bevel gear used for driving oil pump is keyed on rear end of exhaust shaft. Camshafts are mounted on three single row ball bearings.

### Governor and Oiling System

Governor is flyball type, with flyballs bolted to front of water pump gear, operating on an extended shaft and operating sleeve. This sleeve carries a two-point spider that fits into a yoke, mounted on a shaft assembled in a cast-iron handle cover, bolted to front gearcase cover. This handle cover has a machined boss, counterbored for the centering of bearing on the end of the governor shaft.

Oiling system is by combination forced-feed, spur gear



*Upper left—Front end of the Arbenz timing arrangement and gear case. Lower left—Oil pan and oil pump assembly. Right—Ball bearing crankshaft, connecting rod and piston and valve mechanism*

driven pump and splash system. The pump is driven off the rear end of exhaust camshaft by bevel gears through a vertical shaft. The oil pump assembly is mounted in a cast-iron bracket, bolted to bottom of oil pan with one oil connection bolting directly to cast-in oil lead of lower half of crankcase, and one connection to bottom of pan through an oil strainer connection. A check valve, having a by-pass is screwed into rear end of oil lead in oil pan. Rest of engine receives its lubrication by oil vapor caused by the splash system of connecting rod scuppers. A cast-in oil filler with an oil-tapped spring cap is located on the side of lower half of case.

**Water System and Ignition**

Water pump is centrifugal, 4¼ in. in diameter, having an extra wide, bronze impeller, mounted in a cast aluminum body and cover, having a center adjustment for impeller through adjusting screw and nut. Water pump body is held rigidly to motor arm by a three-bolt flange cast integral with body. The water enters in the center of pump through cast-in elbow on cover and passes out on center at side of pump. Intake is 1 in., while the discharge is ⅞ in. Pump is located on the right-hand side, driven by shaft and coupling, keyed to water pump gear.

Ignition system is single, high-tension, type ZU-4 Bosch magneto. A continuation of the armature shaft allows for inertia type governor. This governor is used to advance the armature in the field instead of the customary practice of advancing the breaker box. For checking up the secondary rotor a celluloid window is located opposite contact number one in the secondary distributor cover. The magneto is located on the left-hand side of the engine, and is driven by a gear attached to the end of the armature shaft meshing directly into the camshaft gear.

Carbureter is a 1⅜-in. vertical Zenith. Body is of cast bronze, having a three-way elbow, one for auxiliary air-valve and one used for air-strainer. Throat of venturi is 23 mm. in diameter. Throttle valve is butterfly type. Construction of this carbureter is identical with the American Zenith.

Fan is 22 in. in diameter, four blades. Material, sheet steel. Riveted to aluminum hub with machined fan pulley on rear end. The fan shaft is an L-shaped steel forging with one end mounted on ball bearings with an adjustment screwed into the rear end of hub, while the other end slides up and down in a clamped end of a cast-iron bracket.

**Weights**

Connecting rod and piston, complete, 11 lb. 6 ounces.
Valve tappet assembly, 1 lb. 9 ounces.
Valve, 6 ounces.
Spring, 3 ounces.

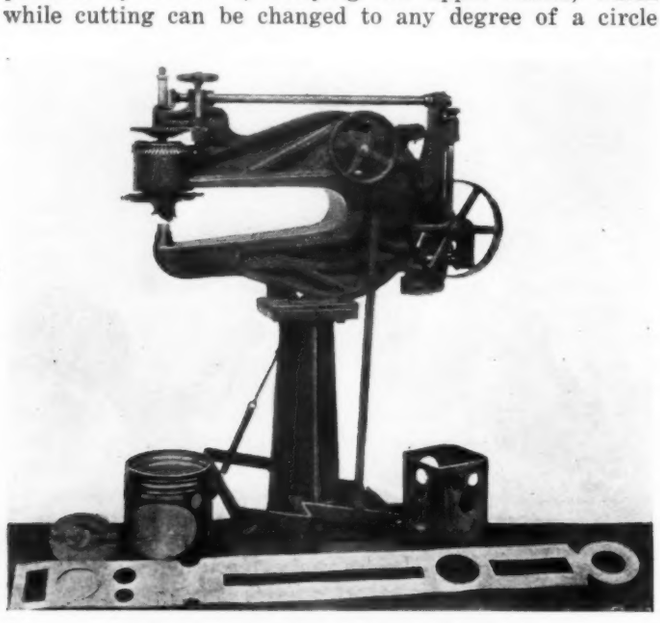
**Remarks**

This engine is compact. Good judgment has been shown in designing this type in regard to service, as all parts are accessible. Connecting rods and pistons can be taken from engine or adjusted by taking off small oil pan. No adjustment is needed on main bearings of crankshaft. This engine is heavy, especially the crankcase, which is of cast iron. Has wall ⅜ in. thick, with large, channel-shaped ribs, reinforcing the motor support arms. The casting is of rough finish, and only finished at contact points with other parts of motor. Cylinder blocks are heavy with no special features. The water circulating area in these blocks is small. This accounts for the large width of the water pump impeller, delivering water and keeping in constant circulation the cooling system.

# New Type of Rotary Shear

A rotary shear that cuts any shaped openings without cutting in from the edge and without turning the sheet, is being introduced by the Southwark Foundry and Machine Co.

This new phase of sheet and plate shearing is made possible by a turret, carrying the upper cutter, which while cutting can be changed to any degree of a circle about the lower cutter. The simultaneous driving of both cutters automatically pulls the sheet through the shear. The line to be cut is accurately followed by turning the guide wheel which controls the turret. This operation can be performed from either side of the machine. It cuts openings in width equal to double the throat depth and no limit on length.



*Southwark Foundry & Machine Co.*

The cutting of circular and oval shapes is done in a continuous operation. In cutting angles the clutch is thrown out by means of the foot lever, the upper cutter is moved to a new position on the converging line, the power is thrown in, and the new cut is made to the first line. The cutting of zig-zag lines and small radii is made possible by a sensitive clutch controlled by the foot lever.

# Electric Arc Welding

IT has been discovered through an investigation conducted by the Bureau of Standards that fusion welds differ from all other types, in that the metal of the weld is essentially a casting. No refinement of this metal is possible in the method as ordinarily carried out. A study of this process made by the bureau consisted in the determination of the characteristic properties of arc fused metal. Such a knowledge is fundamental in any proper study of arc welding. This work has shown that the skill, care, and patience of the operator are matters of vital importance in successful arc welding. The data obtained in this investigation are now being put into shape for publication.

# The Airplane Has Been Put to Work in Great Britain

**The London-Paris aerial mail has been doubled and flights between Croydon, the British terminus to various cities of Europe, are being made in numbers daily. A résumé of the service is given here, with a brief description of a few of the machines making the regular flights.**

ALMOST coincident with the announcement that the American aerial mail has been extended from Chicago to Omaha, the British postal authorities put into effect an enlargement of the London-Paris service, which doubles and makes more efficient the air post between those two cities. The mail is now dispatched from London twice daily, at 9:30 a. m. and at 4:30 p. m., instead of the former single sending at 12:30 o'clock each afternoon. Express packages are permitted under the new regulations and the service otherwise is bettered.

The increase in the continental post is designed to hasten the delivery of mails and packages from England not only to Paris but throughout Europe, Asia, parts of Africa and the Near East and Far East as well. Deliveries to such countries as Switzerland, Italy, Spain, Portugal, Germany and elsewhere will be accelerated from 12 to 24 hours, it was stated, and the new sendings will enable, in many instances by making steamer connection at Mediterranean ports, quicker dispatch to the English colonies of Africa, Asia and elsewhere. Letters and packages, properly marked for the air mail, may be posted in public letter boxes in London and the surrounding district up to certain times during the night and day, the mails so closing that the parcels or letters will be forwarded on the first available sending.

Aerial postal service, although not so broad, is being maintained with Brussels, and a further extension has been planned to Holland. The governments of the two countries have co-operated in requesting tenders from private concerns for carrying the mail over this proposed route, and it is understood the service will be under way shortly. In addition, regular, if not daily, airplane trips are being made between Manchester, which is a center of British manufacturing industry, to Holland for the dispatch not only of mails but of manufactured goods, principally dyes, between the two districts.

British plans seem to be to link up their country with aerial routes to most of the larger cities and countries of Europe, principally for the more efficient conduct of business but also for the transportation of tourists and visitors. Connecting up the British Empire to the mother country through the establishment of such routes has been forwarded by much effort during recent months. Flight from London to Cairo, as the first step in routes to the colonial possessions in Africa, and thence to India and Australia has been accomplished on numerous occasions, and plans have been made tentatively for the establishment of a regular Cairo service, with probable extensions of it south through Africa and east to India.

The center of the British commercial service is at the Croydon flying field, near London. It has been called the Charing Cross of international air travel, and seems, indeed, to be a center of great air activity. The plant there consists of hangars, field and customs house. The latter, of course, is operated by the government, as also are the hangars and the field. The Civil Aviation Department of the Air Ministry has it under control, and is seeking to make it an up-to-date establishment, with the functions and accommodations of a railroad station. The machines, personnel and flying equipment are provided by a private concern which operates a continental service. However, several companies are similarly engaged and all utilize the big field.

This continental service, of course, is unique in that it maintains itself over a water and land route, connecting cities that are at least twenty hours apart by rail and water transportation. Flight from and to the field is almost constant, numerous machines alighting and taking off every day. In fact, it is said to be exceptional when no more than half a dozen machines, some of them seating as many as ten passengers, do not arrive at the port and as many embark on their journeys to various parts of Europe. Women have been found to make up a large part of the passengers, and it is said they are more anxious to make such trips than are the men.

With the multiplication of the service it has become possible for a passenger to leave London in the morning, spend the afternoon at Paris, and return to London in time for 8 o'clock dinner the same day. Such a service has been instituted by the Aircraft & Travel, Ltd. The customary time for passage is under three hours, and, consequently, the London-Paris trip is a pleasant one.

The machines flown out of Croydon are almost all commercial models built especially for the service. They are not converted war planes, except in a few instances, but are models gotten out by British and French makers for such work. The Airco nine-seater is a recent addition to those on the European circuit. Another new model is the Vickers-Vimy "City of London," which held its trial flights several weeks ago. The plane is double-engined and silver painted, with handsome accommodations to seat 11 passengers.

The French have also put into the service a huge Farman, called the "Goliath," and probably a conversion of the "Goliath" shown at the recent Paris show, which seats ten passengers. It is a slow-moving craft, with a wing spread of more than 100 feet, having two engines, and it is described as fitting barely into the largest shed on the Croydon field.

The British aerial mail is conducted on a policy that differs greatly from that of America. Special rates are charged for letters and packages—48 cents an ounce—and only mail marked for such service is carried. The American plan, as is well known, is such that the planes take whatever mails are available, regardless of the stamps affixed.

# Failure of Connecting Rods at High Speeds

**There are some disadvantages in tapering a connecting rod from a large section at the crank end to a smaller one at the piston. The use of hollow tubular rods for racing purposes is considered advantageous because the section being uniform throughout is least affected by inertia at high speeds.**

By G. Wiedeman

WITH the resumption of racing at Indianapolis, interest in the sport will probably be keener than it was before the war. When the subject of automobile racing is mentioned, we are reminded of the many cars that are eliminated in the speed classics by connecting rod failures. It is proposed here to investigate some of the factors affecting connecting rod design, with a view to determining desirable characteristics.

In the first place, the use of hollow tubular rods for racing purposes should be recognized as sound practice, not because of any advantage of the round section over others but because the section that remains uniform throughout its entire length is least affected by inertia at high speeds. In other words, there is a distinct disadvantage in tapering the rod from a larger section at the crank end to a smaller section at the other end.

Let us consider a uniformly tapering rod as sketched in Fig. 1. Let us call the area of the section at the left $A$ and that at the right $B$, $w$ the weight per unit length, $\omega$ the angular velocity and $r$ the crank radius. Then the maximum centrifugal force at any section for unit length is given by

$$\left(A + \frac{x}{l}\,[B\text{-}A]\right)\frac{wx\omega^2 r}{l}\text{ lb.}$$

To determine the bending moment at any section of the rod, we must first calculate the value of the end reactions. If the rod were uniform, we know that the centrifugal forces would have their resultant acting through a point two-thirds of the distance from the piston pin. The general expression for the location of this point is

$$k = \frac{I_r}{wx_o}$$

(where $I_r$ = Moment of Inertia about Wristpin, $W$ = wt. of rod and $x_o$ = distance from wristpin axis to center of gravity of rod), but as both $I_r$ and $x_o$ increase as the rod section is changed from uniform to tapering, we may assume without appreciable error that $k = \frac{2}{3}$.

We can now estimate the value of the bending moment at any section

$$B.M. = \frac{lw\omega^2 r}{6}\ (A + 2B)\ \frac{x}{3} - w\omega^2 r\left[\frac{x^2 A}{2l} + \frac{x^3}{3l^2}\ (B\text{-}A)\right]\frac{x}{3}$$

Examining this expression, we can readily convince ourselves that the condition of minimum bending moment is obtained when $B = A$. It follows, therefore, that minimum bending stresses result when a uniform rod is used. The additional advantage of a lighter rod (that is, one that has a uniform section throughout) is in the fact that piston wall pressures as well as crankshaft stresses are somewhat reduced. If greater column rigidity is desired for a connecting rod, the area may be kept constant but the moment of resistance at the center may be increased by the use of a thinner web and flange, thus retaining practical forging possibilities.

Another source of trouble in connecting rods for high speeds is the transverse sympathetic vibration of the rod as a whole when under the action of the centrifugal forces that reverse each revolution of the crankshaft, as shown exaggerated in Fig. 2. This vibration may be predicted from the general formula for free vibration of elastic bodies. For one complete vibration

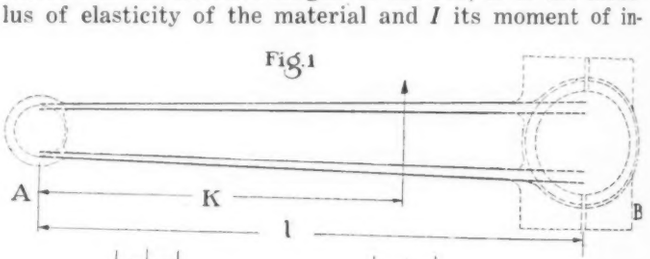
$$T = 2\pi\sqrt{\frac{M}{K}}$$

where $M$ is the mass of the inertia element and $K$ is the force that produces unit deflection of the rod (transversely). By working through the equations of the elastic curve for beams under deflection, we can substitute for $K$

$$T = 2\pi\sqrt{\frac{Ml^3}{85\,EI}}$$

where $l$ is the effective length of the rod, $E$ is the modulus of elasticity of the material and $I$ its moment of in-

Fig. 1



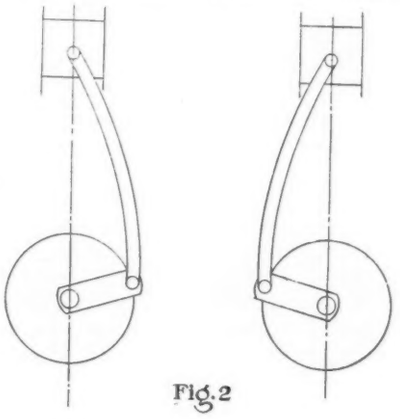



Fig. 2

ertia about a plane through the axis of the rod and the piston-pin. To calculate values so that we can substitute in the formula, we use the rod design described in the April 1, 1920, issue of AUTOMOTIVE INDUSTRIES, "Design and Construction of the 183 cu. in. Engine," page 808. We find that the critical speed at which the rod would vibrate in unison with the rotative speed is 5250 r.p.m. We would not, therefore, expect to encounter trouble in this particular design from transverse vibration of the rod.

If we put the equation for transverse rod vibration in another form so as to obtain the critical r.p.m. directly, it becomes

$$\text{r.p.m.} = \frac{30}{\pi}\sqrt{\frac{85\,E\,I}{M\,l^3}}$$

We can then see more easily that the length of the rod is the most influential factor, but when this condition is fixed, the remedy for a low critical speed is evidently a larger moment of inertia of section or smaller rod mass.

In general, connecting rods break in tension. If the transverse critical speed, as calculated above, is not attained, we may look to two other causes of failure. The piston inertia forces may be great enough to cause fracture in tension. The cycle position of maximum tension on the connecting rod is evidently on the suction stroke just as the piston is leaving the upper dead-center. The mathematical value of the total tension force is given approximately by

$$T = A\,[0.00017\,r\,N^2\,(1+n) + p]\,\omega$$

where $\omega$ = recip. weight/sq. in. piston area
$A$ = piston area
$r$ = crank radius
$N$ = crank r.p.m.
$n$ = ratio of crank radius to connecting rod length
$p$ = pressure in cylinder during beginning of suction in lb./sq. in.

The value of this tension force in the case of the same rod mentioned before is 1610 lb. or 8000 lb./sq. in. at 2000 r.p.m. Therefore, the rod section is satisfactory from this viewpoint.

There is one other possible source of failure of rods at high speeds which is perhaps the commonest to be met with in practice. This is due to the sympathetic vibration of the connecting rod longitudinally under the influence of the inertia and explosion forces, which vary quite regularly through a cycle. This is especially true of the inertia forces, which reverse twice per stroke. Combining Hooke's law of elasticity with the general vibration formula, we obtain for the critical longitudinal speed

$$\text{r.p.m.} = \frac{30}{\pi}\sqrt{\frac{g.\,E.\,A.}{F.\,l.}}$$

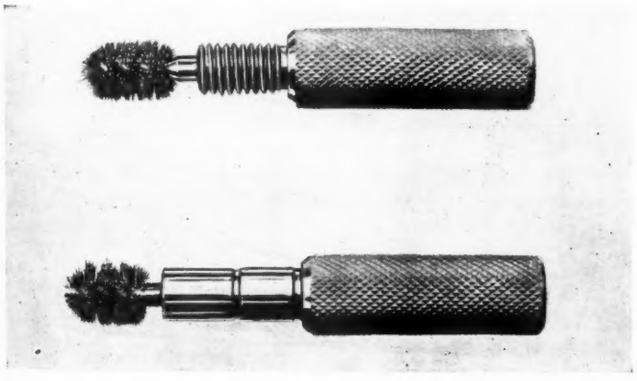
where $g$ = the accel. of gravity.
$E$ = mod. of elasticity
$A$ = least area of rod
$F$ = max. force applied
$l$ = length of the rod.

Substituting the values obtained for the same rod, we obtain for the critical speed 3280 r.p.m. If this speed is maintained for any length of time, the amplitude of the vibrations will increase and ultimately break the rod in tension. Difficulty from this source may be obviated by an increase in the modulus of the material used or an increase in the least rod area or else in a decrease in inertia forces or length of connecting rod. All of these factors have the same degree of influence upon the longitudinal critical speed.

# Combination Brush and Gage

IF interchangeable parts are to be produced with accuracy, it is necessary to check them with gages. These gages, being precision instruments, are expensive and require careful use, but it is very difficult to get the average workmen to use them with the necessary care. It is practically impossible to insure that each article to be tested is carefully wiped free from foreign substances before the gage is applied, and as a result the foreign substances wear upon the surface of the gage, at the same time interfering with absolute accuracy of measurement.

In order to provide a wider field for gages and to lessen their cost to manufacturers a combination of brush and gage has been developed and patented by Herman L. Wittstein, works manager of The Chapman Valve Manufacturing Co.



*Brush pilot gage*

It is claimed that by the use of this combination more accurate results are obtained and the life of the gage equipped with a brush is at least three times that of the gage without a brush. The brush on the gage tends to act as a pilot, thereby eliminating almost entirely the wear commonly occurring at the entrance end of the gage.

It cleans the surface before the gage enters, removes all foreign material, thus preventing abrasive action, and at the same time gives increased accuracy to measurement and increased speed in the inspection work.

The spiral brushes are so made as to leave the bristles at slightly varying lengths, so that when the brush is used in conjunction with a screw gage, the bristles tend to clean out the thread both at top and bottom.

A company has been formed under the name of the "Brush Pilot Gage Co." to manufacture and market Mr. Wittstein's device.

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AN interesting side light on the development of foreign markets by progressive American manufacturers is furnished by a catalog issued by the General Commercial Co., Ltd., Yokohama, Japanese agents of the Wright Manufacturing Co. Their product consists of hoists only, and the catalog is printed in Japanese. Mr. Wright is authority for the statement that in foreign countries there is a distinct tendency to favor those American manufacturers who specialize in one product.

# Problems Presented in the Operation of the Railway Motor Car

**Branch railway lines can adapt the motor truck for passenger service if certain problems of construction and operation are solved. This article takes up some of the chief difficulties and points the way out. It also discusses acceleration and deceleration, with a summary of the possibilities.**

By Donald A. Hampson*

STREET railways have taken a leaf from the jitney book and adopted the so-called "safety" car—light, speedy, and one-man operated. Branch lines and independents may do likewise by taking the motor truck and adapting it to passenger service. To be successful, the selection should fall on a light truck, because of its speed; one of known reliability, a make that has been standardized through successive years of manufacture, and on which parts prices are low for the quality delivered.

The previous article, in the Jan. 1, 1920, issue of AUTOMOTIVE INDUSTRIES, showed two such cars running as a double-end train over a standard gage steam road. For these, figures of operating expense are now available covering a period of nine months. The cars were required to make from 30 to 35 m.p.h. between stops and covered 150 miles as the regular day's work.

In a statement of expenses, the general manager includes amortization of the investment in four years. This brings the operating cost—gasoline and oil, two men at 35 to 40 cents an hour, repairs, etc.—up to a grand total of 14 to 16 cents per mile. According to *Electric Traction* for April, "a trolley car in ordinary service runs 150 miles a day, at an average cost of $7.87 for power used." The seating capacity of the ordinary car is twenty-four.

This statement is all the more interesting in view of the operation of three cars of the same size and make over a highway route at the same time. This route lay over good state roads and the schedule called for four trips per day of each car, making a total of but 32 miles. It actually cost more to run these highway buses than the cars on the railroad, though latter made nearly five times the mileage.

An examination of the time table shows that an average speed of 22 m.p.h. was maintained. This is the same running time as that of the steam passenger train, but the motor train was required to make four additional stops on signal. The latter is a feature of operation worthy of notice. The ease and low cost of stopping, together with a high rate of acceleration, make possible a schedule which is a convenience to the public served and which sooner or later will induce more frequent riding. On this particular railroad, the motor trains were added to the steam schedule, and after once thoroughly established they were well filled on most trips, showing that a fixed population will ride more under good accommodations. The line in question is laid with 75-lb. rails, is not in the best condition as to joints and alignment; it is practically level except for 1500 ft. of 2 and 3 per cent grade near each terminal.

The engine on these cars is 27 hp., S. A. E. rating, governor controlled at 1400 r.p.m., which allows a speed of 35 m.p.h. at only a slight excess over the 1000 ft. p. m. piston speed. A number of these installations are in use in various parts of the country, on roads where the grades are not so heavy as to restrict traction with the single pair of driving wheels—some have twenty-four-passenger bodies and others have sixteen-passenger.

Taking the sixteen-passenger car for example, its drag as a trailer and its power as a motor car will be consid-

*Associate Member, A. S. M. E.

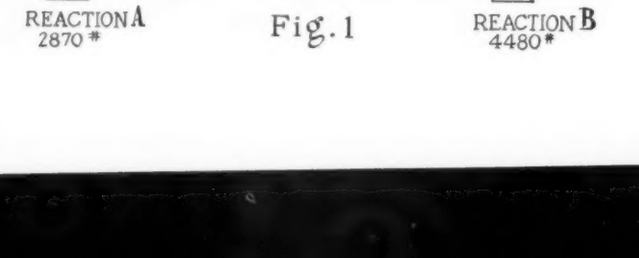



Fig. 1

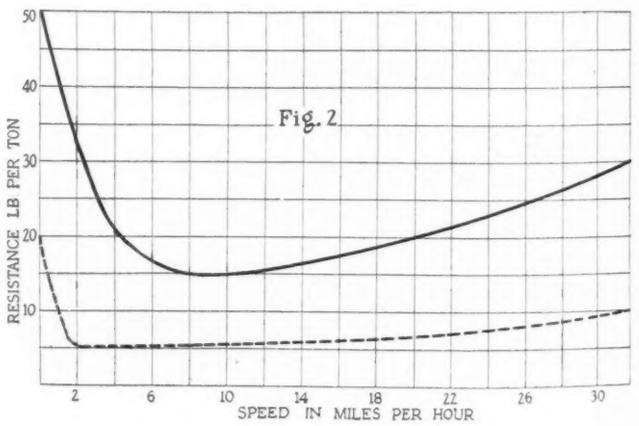
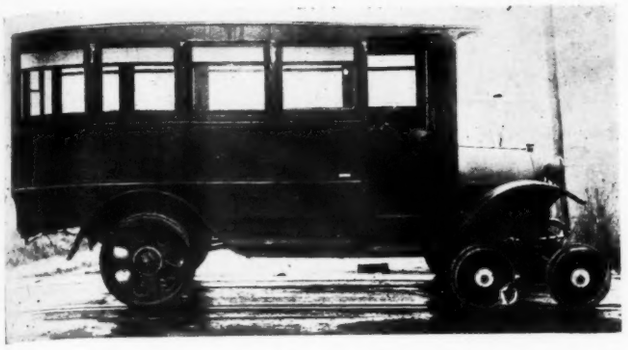



Fig. 2



*One of the two 16-passenger cars operated by a Florida railroad*

ered. Fig. 1 is a diagrammatic representation of such a car, railroad equipped, and without the substitution of a leading truck. The weights on the front and rear are actual scale readings—the live load is estimated at 160 lb. for each of sixteen passengers. To get the total weight on the drivers, which is the weight available for tractive purposes, the calculations are made by taking moments about *A*—

dead load $2500 \times 128 = 320{,}000$
live load $2560 \times 74 = 253{,}440$

573,440 in.-lb.

From which we get the weight on the rear as

$$573{,}440 \div 128 = 4480 \text{ lb.}$$

The weight on the front wheels is the difference between full load and a good rail. More adverse conditions may be relieved by a judicious seating of passengers and the use of sand boxes.

The maximum resistance of any car occurs in starting. The curve of Fig. 2 is based on readings taken from a new car with new wheels, without any warming or limbering up. Up to 10 m.p.h., the readings were taken from a heavy spring balance arranged as a coupling between two cars, while above that speed, the space between the cars was measured and referred to the compression of the draw bar spring, which was calibrated. While the resistance indicated is high and does not represent a daily average load, nevertheless it is a load that must be hauled in the beginning, before treads and bearings and brakes have worn in to a nice running condition. After "running-in," the resistance very nearly approaches that given by the formula

$$R = 5 + 0.004\,V^2$$

and from which the dotted curve was plotted.

As only one engine is running (the other car being a trailer), it must exert a tractive effort great enough to move the weight of both cars. The resistances due to grades, curves, and poor track must be added to that of speed.

A conservative formula for tractive effort is—

$$T.E. = \frac{5 \times B^2 \times L \times N \times R}{D} \quad \ldots\ldots\ldots (1)$$

in which $B$ and $L$ are bore and stroke, $N$ is the number of cylinders, $R$ the gear reduction, and $D$ the wheel diameter, all sizes in inches. This formula gives results about 15 per cent lower than the much used one for draw bar pull—

$$D.B.P. = \frac{H.P. \times E \times 375}{M.P.H.}$$

and consequently it is a safer one to use when wear, mishandling, and improper adjustment are not allowed for.

These cars use a 4⅛ x 4½-in. engine; they have a gear reduction of 3.73 on high and 13.5 on low, and 30-in. wheels. By the first formula, then, the *calculated* tractive effort on low is found to be 690 lb. This becomes *realized* tractive effort, or draw bar pull, only when it does not exceed the adhesive weight on the drivers. The latter in this case was 1120 lb., much greater than the 690, which assures against slipping.

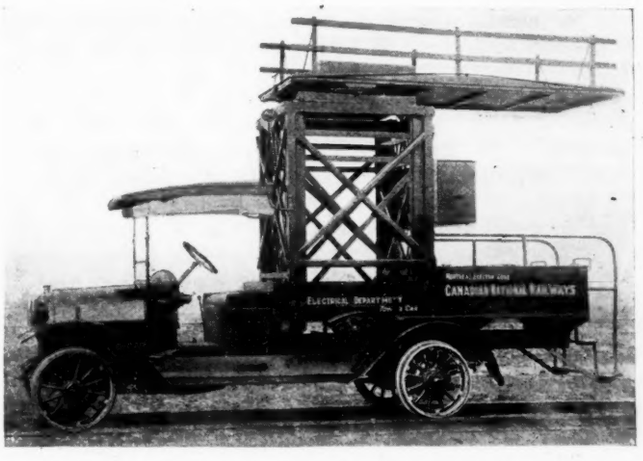
Naturally, the size of wheels employed affects the draw bar pull—the smaller the wheel, the greater the draw bar pull, other things being equal. In cases where greater pulling power is required or it is desired to keep the center of gravity lower, or large wheels cannot be secured, smaller ones may be used. But for a given speed per hour, the engine speed will be correspondingly higher and it will be necessary to alter the gear ratio or to govern the engine so that its speed will not induce overheating.

The sixteen-passenger car shown in the photograph is operated by a Florida railroad. It will be noticed that fenders and runningboards have been left in place. The reason for this is that the cars are used part of the year on dirt roads that are none too good. The change to the four-wheel front truck was to secure greater safety and smooth riding on curves, over the railroad line, which is both tortuous and run down.

The other picture illustrates a service car used on a Canadian railroad. Like the others it is a Reo Speed Wagon chassis, converted to railroad use. As a test, this machine was run over the rails from Montreal to Winnipeg and return. The superstructure is an elevating tower for repair work on overhead lines. A feature of this car is a second "transmission" installed back of the standard transmission, which provides the same speed backward as forward; the purpose of this arrangement is to enable the crew to travel either way with facility, should the train schedule or the absence of turn-outs require it. The open body and posting a lookout on the "rear" end make running in this direction equally safe. In operation, the lever for this reverse transmission is placed "in" or "out" and held there by a spring catch; then the normal speed changes are made (for either direction) by the usual cane handle.

Judging from the cars that are out—and these are working under typical conditions—the item of wear and tear is not as serious as the enemies of gasoline cars would make out. Particularly is this true of that great bugaboo—gear stripping. All have traveled from 25,000 to 100,000 miles and, up to the present time, not one has had a gear replaced.

At first, some trouble was experienced with universal joints, but this entirely disappeared with a change from metal to thermoid universals. Three or four rear wheel




*Converted to railroad use, this car is operated as a service vehicle in Canada*

bearings have been renewed and as many cup-and-cones for the front wheels where the change was not made to swivel trucks. In some instances a passenger load of 2½ tons was crowded into a car designed for half that load.

One of the mechanical details of converting the motor truck to railway passenger and miscellaneous usage is that of wheels. One or two supply houses and automobile concerns have specialized along these lines and keep wheels and rims for certain makes of trucks. These have to be made up from new patterns, for no standard wheels will machine to the right dimensions and the steel tires in stock are too large.

For the assistance of anyone who is getting out wheel patterns, Fig. 3 has been drawn. It is well known that standard gage tracks are 56½-in. wide and the average person would say that wheels were the same. But pinned down to facts, it is discovered that wheels and track have no measuring points in common. The track is of the width named, which is supposed to be measured ⅝ in. down from the top of the rail. The radius of the rail when new is 5/16 in., while that of the inside of the flange is 11/16 in. Master car builders have established a wheel gage point ⅝ in. below the point of tangency with the tread, and the distance between these gage points has been established as shown. The height of the flange is made 1 in. Street car wheels differ in having decreased height of flange and width of tread, the former to give clearance in grooved rails and the latter to prevent riding on "high" bricks of paved streets.

Steel wheels or tires show greater adhesion, and are better for tractive purposes on that account—due to the coefficient of friction between the two metals. On steam roads, steel alone is used to drive (for locomotive wheels), but on electric railways vast numbers of chilled cast iron wheels propel the cars. Ordinary cast-iron wheels would not last over a month, even under a motor car; neither would the pressed steel wheels which are made for section gang and inspection cars. Iron wheels have a hard face about ⅝ in. deep, which resists wear so well that the "tire problem" of the railway car is settled in the beginning.

It is necessary to cast wheel treads against a chill to secure the hard face. The chill is machined to correct shape and the casting thus turned out is in many respects similar to a die casting; it should be true to form and round to within 1/32 in. or better, so requires no machining. Fig. 4 is a sketch of the wheel molding arrangement. Gray iron foundries cannot make satisfactory wheels, however, as special mixtures of iron are required and annealing furnaces called "soaking pits" have to be provided to temper the casting to a degree of safe toughness.

Acceleration is the rate of increase in velocity. Letting $a$ be the acceleration in miles per hour per second, $F$ the tractive effort in lb., and $W$ the weight of cars in tons,

$$a = \frac{0.01\,F}{W} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Taking, for example, the car in our earlier discussion, we find that on low gear it has a rate of acceleration

$$\frac{0.01 \times 690}{3\frac{1}{2}} = 2 \text{ m.p.h. per second}$$

which is a high rate, and explains the rapid get-away of the gasoline car. Of course, the power curve of the engine is not constant throughout the speed range of any one gear. On the higher gears, the rate is lower, since it is directly proportional to the force applied at the base of the wheel. During some trials on

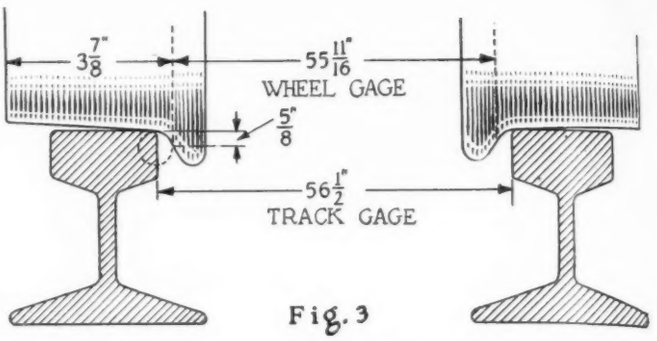


Fig. 3

the road whose profile is given in Fig. 5, it was found that the rate of acceleration was much higher, both on the grades and level, than that of the road's 28-ton electric cars driven on all eight wheels by four 40-hp. motors. This is a typical trolley line in a hilly country and the profile shows numerous steep grades.

The rate of acceleration is affected by several factors, *i.e.*, train resistance, grades and curves, which must be included in figuring that rate for various physical conditions. The actual tractive effort in such cases is found by subtracting the sum of these resistances from the draw bar pull; the remainder thus found, multiplied by the constant 0.01 and divided by the weight, will give the rate of acceleration in miles per hour per second.

Slippery rails and poor driving may decrease acceleration to a large extent. Sand is about the only remedy for the first. Poor driving consists of spinning the wheels—on a sharp up grade or with a light load on the drivers or in changing to a higher gear too soon. This is entirely a personal equation. Under adverse conditions, the rear wheels of a motor car can be made to hold to the rail for a satisfactory start if the driver is skillful enough to keep their speed down, and the best way to insure this kind of a start is to set one of the brakes up a couple of notches—this prevents spinning—releasing when headway is gained.

In braking, the two elements to be overcome are the longitudinal inertia of the car and the rotative inertia of the wheels. The latter is considerably more with metal wheels than with wood wheels and rubber tires, but as it constitutes only about 3 per cent of the total inertia, it will be disregarded here. The familiar formula for kinetic energy is

$$e = \tfrac{1}{2}\, mv^2.$$

This becomes

$$e = \frac{w\,(1.47\,M)^2}{64} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

when the velocity $M$ is expressed in miles per hour and $w$ is the weight in lb. To consume this energy and stop the car, some force $e$ must be applied throughout a certain distance, either the natural train resistance of a coasting stop or the friction of the brakes for service or

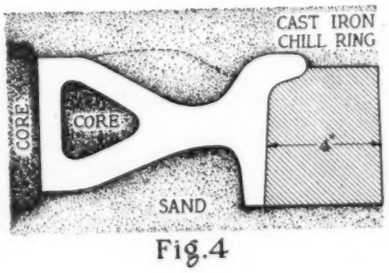


Fig. 4

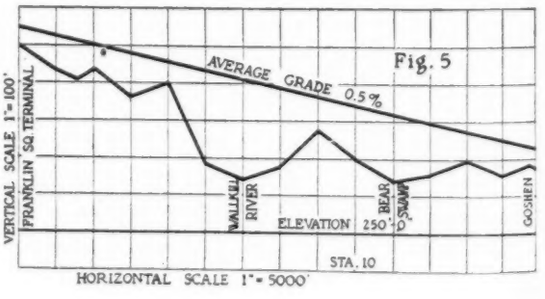


Fig. 5

emergency stops. Expressing the total force applied in lb. by $p$ and the distance in feet between the point of application and the stop as $s$, then

$$e = p \times s \ldots\ldots\ldots\ldots\ldots (4)$$

Using our 4-ton car for example, and assuming a speed of 30 m.p.h., the energy therein is

$$e = \frac{8000 \times (1.47 \times 30)^2}{64}$$

$$= 242{,}000 \text{ ft. lb.}$$

To bring this to a stop in 500 ft. requires a total braking force of

$$242{,}000 = p \times 500 \text{ or } p = 484 \text{ lb.},$$

which is a pressure of 121 lb. per ton. Modern interurban practice in the electric railway field tends toward a high rate of braking, which may be up to 200 lb. per ton.

With the converted motor car, it is not so much a question of how much braking pressure is available as it is of how far that pressure may be exerted without skidding the wheels. Sliding the wheels (on rails) does not produce the instantaneous effect that it does on the highway. On the rails, if the clutch is thrown out and the brake applied, a sudden stop is well nigh impossible because the wheels lock at once; but if the clutch is left in, so the engine keeps the wheels turning, the brakes may be applied and the maximum benefit of static friction is realized in bringing the car to a stop. The foregoing disposes finally of the argument that air brakes are necessary for these light motor cars. They are not, for the reason that the band brakes of the chassis are already possessed of a greater power than can be utilized.

Returning to the other mode of stopping—coasting—on a level course, this depends upon the air resistance and the internal resistances of the car itself, these being summed up as "train resistance." This may be placed at a maximum of 20 lb. per ton—it might easily be as low as 15 lb. Accepting this resistance, we wish to know how far the car will coast before coming to a stop. Using the same example as before,

$$e = p \times s \text{ or } 242{,}000 = 20 \times 4 \times s,$$

from which we find $s$ = 3025 ft., the distance that the car will coast.

Safer control may sometimes demand more effective brakes which are secured by braking on the front wheels as well as the rear. In cases where two front wheels, of the same size as the rear, have been used and these locked or permitted but a slight movement, a brake drum and band brakes have been applied successfully. Brake shoes, as in standard railroad practice, may also be used all around, though this seems like an unnecessary expense when the chassis is already supplied with adequate brakes.

Fig. 6 illustrates a rather novel brake applied to the leading truck, when used. It utilizes the (otherwise useless) steering wheel as a brake wheel. When this is turned to the right it moves backward the arm that ordinarily connects with the drag link. The small grooved wheels *W, W, W* direct and control a ⅜-in. cable from the drag link arm that passes down through a hollow king pin in the center bearing and fastens to the arm *A* on the shaft *S* that applies pressure to all four brake shoes. The truck may swivel to suit any curves without affecting the brakes on the wheels.

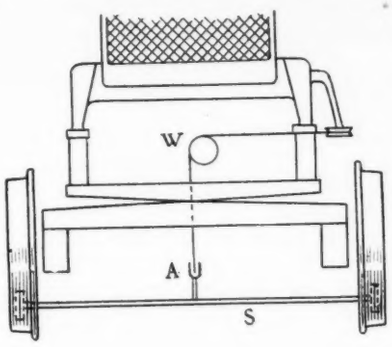
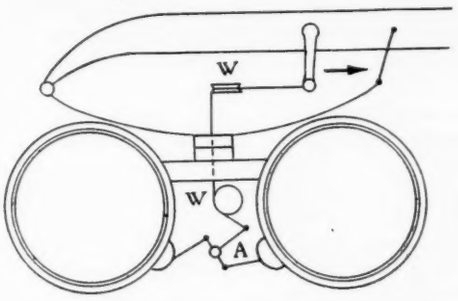



Fig. 6




When two-car trains are run, it is advisable to have one or both brakes on the rear car under control of the driver. An arrangement for doing this will be found in Fig. 7, which is a skeleton diagram of part of the frames and cross members and the essential features of the brake.

The rod back from the pedal is disconnected from its customary rear arm and hooked to the floating lever *FL* as shown. One end of this carries back to the brake tube on the cross member and through it and the rods *E, E* to the bands on the front car rear wheels. To the other end of the floating lever is attached the cable which runs back between the two cars and to a similar floating lever on car No. 2. Car 2, the rear car in either direction, has the pedal locked back. This makes a fulcrum of the joint *P* and the pull on the cable pulls the rear rods *E* just as if done from the driver's seat at that end. This gives one operator equal braking control of both cars.

It is necessary with such a brake system to secure the rear axle housings from turning, or else to change the brake toggles so they do not produce an unbalanced torque when running backward. By way of illustration, car 2 shows how a connection may be made with the original arm at *s* when desired to operate the car singly: then the cable is disconnected at a turnbuckle midway between the two cars and the tree end hooked up. For two-car operation the cable is run between the two in such a way that the curves of switching do not alter its length an appreciable amount.

The measure of a wheel's power to stop a car is in direct proportion to the weight on that wheel. Referring to Fig. 1, it will be seen that when fully loaded there is about 50 per cent more weight on the rear wheels than the front ones, and the natural conclusion is that the front wheels do not "cut much of a figure" in the braking of a car. However, the application of the brakes relieves the rear wheels of some of their load and throws it forward

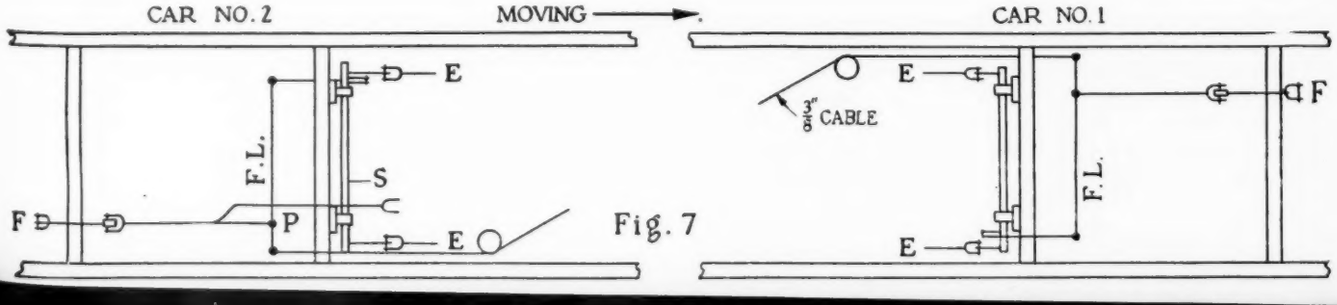



Fig. 7

putting more weight on the front wheels or truck and increasing their braking power; this is a phenomenon long recognized in railroad work, important enough in the braking of heavy cars to justify compensating brake levers for the front and rear trucks.

Most electric roads have jitney competition, and this makes deep inroads into the receipts and cuts down the speed where both use the same streets. This competition, along with rising costs, has forced the abandonment of many electric roads and their rails have become hardly discernible streaks of rust through the country or covered up on city streets. The writer is firm in the belief that trolleys and jitneys should never occupy the same street, aside from unavoidable short distances. Left to the daring and whims of the chauffeur who picks out his own track, the jitney delivers faster service only at the risk of pedestrians and the blocking of electric traffic. With no taxes to pay, little investment, and no overhead such as powerplants and transmission lines to maintain whether there are few or many passengers, it is little wonder that electric roads have succumbed to jitney competition.

**Over Abandoned Trackage**

The light gasoline motor car, such as we have been considering, will positively furnish a dependable unit over abandoned and losing trackage. A single car or a succession of cars operating on rails will afford better, safer transportation than jitneys; and the maximum carrying capacity of every means of transit known in the mechanical realm is always realized when that means is continuous, along a definite fixed line. So if our buses are put on flanged wheels we have the good features of the jitney without the objectionable ones.

An argument raised against the "invasion" of the gasoline car is its lack of ruggedness and reliability as compared with the trolley. A visit to car barns, where are seen fully half as many cars in reserve as on the road and the gang of men constantly employed in the upkeep of this "rugged and reliable" equipment, will materially weaken this argument. The tie-up to traffic in case something goes wrong is another argument even less serious than the first; in case of such delay, the light car may be easily derailed and pushed to the side of the street without holding up the car behind.

Fig. 5 is the profile of a (typical) road that operates two-man, 28-ton, forty-passenger cars on a half-hour headway with a running time of 25 minutes each way. It shows numerous grades, some of them as high as 10 per cent for short distances—it does not show the curves of 30 and 40-ft. radius at street corners and out in the country at the foot of grades. A sixteen-passenger gasoline car in trials over this route has made the round trip of 14 miles on three-fourths of a gallon of gasoline and done it in less time than the electric car, this latter because of the lighter weight per passenger and the higher rate of acceleration.

For greater safety at high speeds on a line with numerous curves, a leading truck should be used. It makes smoother riding and offers a flexible wheelbase. On city tracks, 128-in. wheelbase is longer than that of the longest rigid-truck cars in use. For the gasoline car, it is recommended that the steering gear and the usual front wheel spindles be retained—their presence greatly reduces the friction of passing over a curve, the front wheels automatically following the change from a tangent.

With swiveling front wheels and the motor car rear axle, a number of weaknesses of the electric are avoided. This combination would not require the greasing of rails on curves; it would do away with a heavy item of expense for track work—the renewal of curves, which are worn largely by the sliding of wheels on rigid axles and which would be entirely eliminated by the motor car's four wheels *rolling* independently—not sliding.

How serious this curve friction is may be noted by analyzing the stress in the axle of a trolley car. For example, take 30-in. wheels on a 4-in. axle carrying 5 tons around a 40-ft. curve (the wheels are pressed on the axle and must slip and slide to get around). The torsion (stress) thus produced in the axle is equal to the load on the wheel multiplied by the coefficient of friction multiplied by the radius of the wheel. Assuming a coefficient of 0.25, the stress is

$$5 \times 2000 \times 0.25 \times 15 = 37{,}500 \text{ in.-lb.}$$

Combined with the load, the driving torque and the centrifugal force, the axle is well loaded. The differential avoids this one stress entirely; thus, instead of being a complication, it is a saver of power and a reducer of stresses.

There are a number of facts that we may sum up in conclusion.

1. A good motor chassis is readily converted to railroad purposes by the application of suitable wheels.
2. The fitting of a suitable body to this chassis gives a proven, serviceable, self-propelled vehicle for light passenger or express purposes.
3. It is the cheapest means of passenger transportation at this time for smaller railroads.
4. If the loads are kept below twice the manufacturer's rated carrying capacity, there is less wear on parts and less fuel consumption than in highway service under the same conditions, and the tire item is wholly eliminated.
5. The gasoline car is not offered as a substitute for the steam train nor for the electric car where there is now business enough to keep these on a paying basis.
6. Losing small roads may buy and operate motor cars for their present traffic at an ultimate saving over their existing motor stock, and abandoned roads can be opened up for motor cars at a minimum expense.
7. The problem of forward and reverse operation presents no great difficulties under average physical conditions.
8. It makes no difference whether there are two or more driving wheels so long as the total weight on the drivers is the same.
9. It is possible to offer speed with safety, cleanliness and comfort.
10. The gasoline motor car will maintain street car schedules with ease, its construction is particularly adapted to the sharp curves of such lines, and the possibilities in this direction for smaller cities are so good as to command attention in preference to jitney and bus traffic.

## Process of Producing Fuel Alcohol from Wood

THE first step in the process of obtaining alcohol from wood is digestion at a pressure of 115 pounds for fifteen minutes in dilute sulphuric acid. The cooked wood is transferred to a series of cylindrical cells so connected that water may be passed through them in rotation. From these cells an extract called "acid juice" is obtained which holds in solution practically all the sugar mixed with other water-soluble ingredients. This liquid is neutralized, either with high-grade limestone or slaked lime. Calcium sulphate is produced, which requires about twelve hours for settling. The clear juice is drawn off and cooled to about 88 deg. Fahr., yeast added, and the fermentation carried on in the usual way. The juice must be slightly acid, as ordinary yeasts do not operate well in alkaline solutions. By distillation the alcohol is obtained, and may be readily refined.

# How the Safety Engineer Helps to Boost Production

**In this article Mr. Briggs tells of the warfare between the production engineer and the safety man, which later became co-operation because the man with the no-accident devices was able to show that he increased the output by keeping the men on the machines for more hours.**

By C. A. Briggs*

TEN years ago, when the loss of man power through accidents commenced to be felt in the industries, compensation acts were projected in several States and competition became stronger in all lines of business. A new element thus was brought into the life of the shop and the factory. Somebody was getting inquisitive and going about asking questions when an accident occurred and causing a great deal of embarrassment among foremen and assistants if Mike or Tony got caught in a gear or became too friendly with the buzz saw.

After a while, this same fellow who wanted to know all about how an accident happened was even commencing to insist that little things like gears, saws, sprocket chains, various wheels and pulleys, swiftly moving belts, reciprocating parts, etc., be covered with metal or boxed in so as to prevent accidents. He was going so far as to ask that this be done even where an accident had never occurred. Some of the devices and plans which this man submitted as corrective measures were found to interfere seriously with the output of certain machines, and then and there developed a bit of opposition between this man, later called the safety engineer, and the production men.

This somewhat strained relation was unquestionably well founded for the reason that not until late years was it proven that a safety guard or device could just as well be made that would not interfere with the output of certain machines, but that oftentimes would increase the output.

Guards were at first made with the sole idea of keeping the employee from getting hurt. While this was a laudable ambition, the safety engineer's day did not fully dawn until he commenced to study and build from the employer's angle, and then he found that a little agitation of gray matter would bring forth a safety device that would perform the two-fold function of "More Protection and More Production."

In every plant now where enough hazards exist to retain a safety department you will find the production department in complete harmony with them—so much so that a good production man will often call up the safety engineer and ask him to furnish equipment for a machine that he thinks has an accident possibility. He has faith that whatever device is installed will not seriously interfere with the output and that likely it will increase his production, because, taken away from the constant fear of personal injury, the employee confines his attention strictly to the job at hand, with consequent increase in his efficiency.

Take for example the traveling saw, or, as sometimes called, the railway saw, shown in the illustration. This saw travels from the rear of the table to the front, toward the operator, by a foot lever movement. No guard could be found on the market that would cover this saw satisfactorily in its travel back and forth. The safety engineer finally conquered the problem by constructing an aluminum guard that would act with the saw and cover it to the complete safety of the operator and, what is stranger yet, to his complete satisfaction.

The guard shown on the cut-off saw is made on the same general plan, except that the spreader to which the hood is attached is stationary and fastened to the table by brackets underneath. These guards are entirely automatic in action, raising with the pressure of the material to be sawed. The front of the saw guard acts somewhat independent of the hood and drops down as soon as the material passes it and covers the saw, a very good point in safety as sawyers are frequently injured when they attempt to clear the small blocks from in front of the saw.

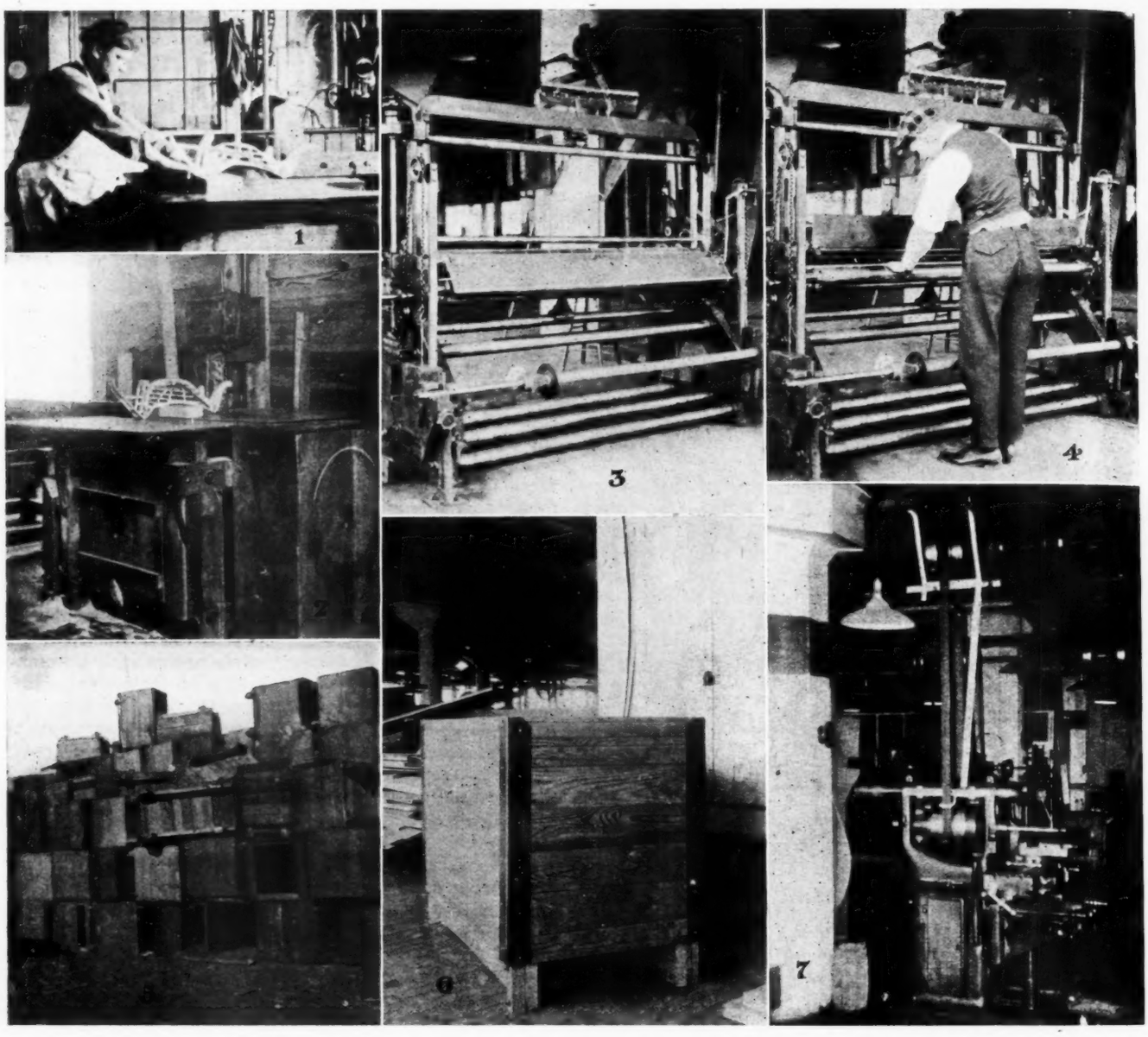
We have found the operators of these machines very hard to convince of the necessity of a guard. They will embrace every opportunity to remove it for a special job and then forget to replace it. We have found that if a new man is placed on a saw that has any kind of a guard he will use it and devise ways and means to keep it on for almost any kind of a job; but an old timer, one who has run a saw for ten years "and never lost a finger yet," will show just as much ingenuity in getting rid of the guard. We have known cases of these "old timers" losing a finger or two after removing a guard that they forgot to replace.

Another illustration is the slitting machine guard. Large rolls of fabricoid are placed in this machine; and, passing over a series of rolls, the fabric is cut, in re-winding, into the desired widths. The type of clutch used on this machine had a tendency to engage and start the rolls as the operator was in the act of threading or adjusting the cloth in the rolls. Having several narrow escapes and being caught once so that the repair men had partially to dismantle the machine in order to release the operator's arm, the device shown here was installed and at once corrected the hazard.

The sheet metal panel or hood in front of the long rolls makes it compulsory for the operator to throw it back, as shown in the second illustration. This act engages a brake and effectually locks the machine against starting until the operator finishes his work around the rolls and drops the apron to the position in the first picture. These devices have been installed about three years and have never required any replacements.

Several years ago we found that the dollie boxes or stock boxes used in transporting various materials about the plant were not standing up under the usages to which they were subjected. A condition such as is shown in the

*Safety engineer of the Willys-Overland Co.*



*1—Traveling or railway saw and aluminum guard that "rides with the saw." 2—A cut-off saw equipped with an aluminum guard, automatic in action. Note the position of the front of the guard, resting on the table protecting the saw as the rear of the hood is raised by the 2 x 4. 3—Slitting machine with apron guard running the length of the rolls covering the "intake." 4—Operator of slitting machine is here shown lifting the apron guard to adjust the cloth in the rolls This throws a brake which locks the machine against starting. 5—Defective stock boxes that have been discarded. 6—A better type of construction that was designed to correct the condition shown in the other picture. 7—A home-made cone pulley belt shifter adaptable to different types of machines and conditions*

picture of worn-out and defective stock boxes was an all too familiar sight. We were also getting, as a by-product of this breakage, numerous foot and hand punctures from nails that protruded from the broken boards or that were left on the floor as the boxes were removed. We found also that careless employees frequently resorted to knocking a top or bottom board off to facilitate unloading.

A box was designed, as shown, and adopted as standard. It at once ended this trail of grief. It is designed to allow a dollie truck to be run under it and raised from the floor to be carried away. The sheet metal corner supports screwed to the posts not only protect the sides and ends against breakage, but cover the nail heads that were forever working out and allowing the boards to loosen and start something. A glance at the broken and discarded stock boxes and then at the strongly constructed one will give a mental impression of how a little planning in this instance helped to keep production on the move.

Another illustration of cooperation in the production program is shown in the illustration of the cone pulley belt shifter. Ohio, and other states as well, require a mechanical belt shifter for all cone pulleys.

The advent of the metal belt fastener, while a quick and efficient method of splicing, as compared with the old method of rawhide lacing, carries teeth with this efficiency, and many a machine operator can show the marks in his palms of metal fasteners that had become broken and hooked him as he attempted to change speed by shifting the belt with his hands.

Not finding shifters on the market that were proving satisfactory, considering the price asked, the one shown here was developed. It is easily installed.

# A Foundry Layout Which Lowers the Labor Turnover

**One Ohio manufacturing plant does not share in the general fear that a crisis is at hand in regard to getting foundry work accomplished. A new foundry building, a system of training all molders within the plant and an effective production system, are the chief factors in its confidence.**

"HOW does the labor turnover in your foundry run in proportion to the turnover in other parts of your plant?"

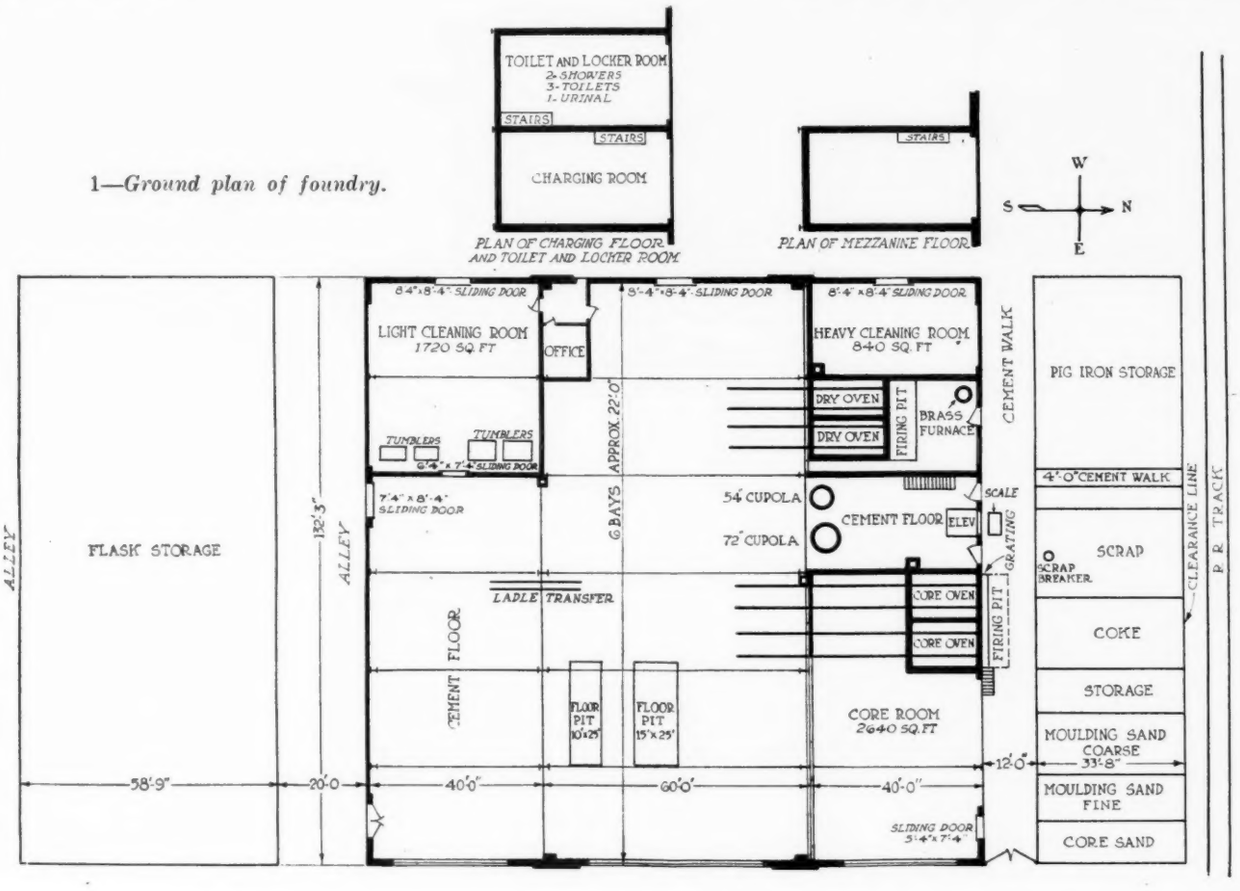
This question was recently asked of the factory superintendent of a machine tool works in Ohio. His answer was: "It is about the same. We do not find it any more difficult to get men for the foundry than for any other part of our plant. This is especially true since we erected the new foundry. Why, I have men coming to me every day asking to be allowed to go in there and learn the molding trade."

To anyone familiar with general conditions in the foundries of this country, the foregoing statement sounds almost like a fairy tale. As a rule, men shun the foundry, because it is generally an undesirable place in which to work. Yet, a further investigation of facts and methods shows that it has been possible at the Defiance Machine Works to meet to a great extent the problem of labor turnover in the foundry.

This successful achievement is due to several factors:

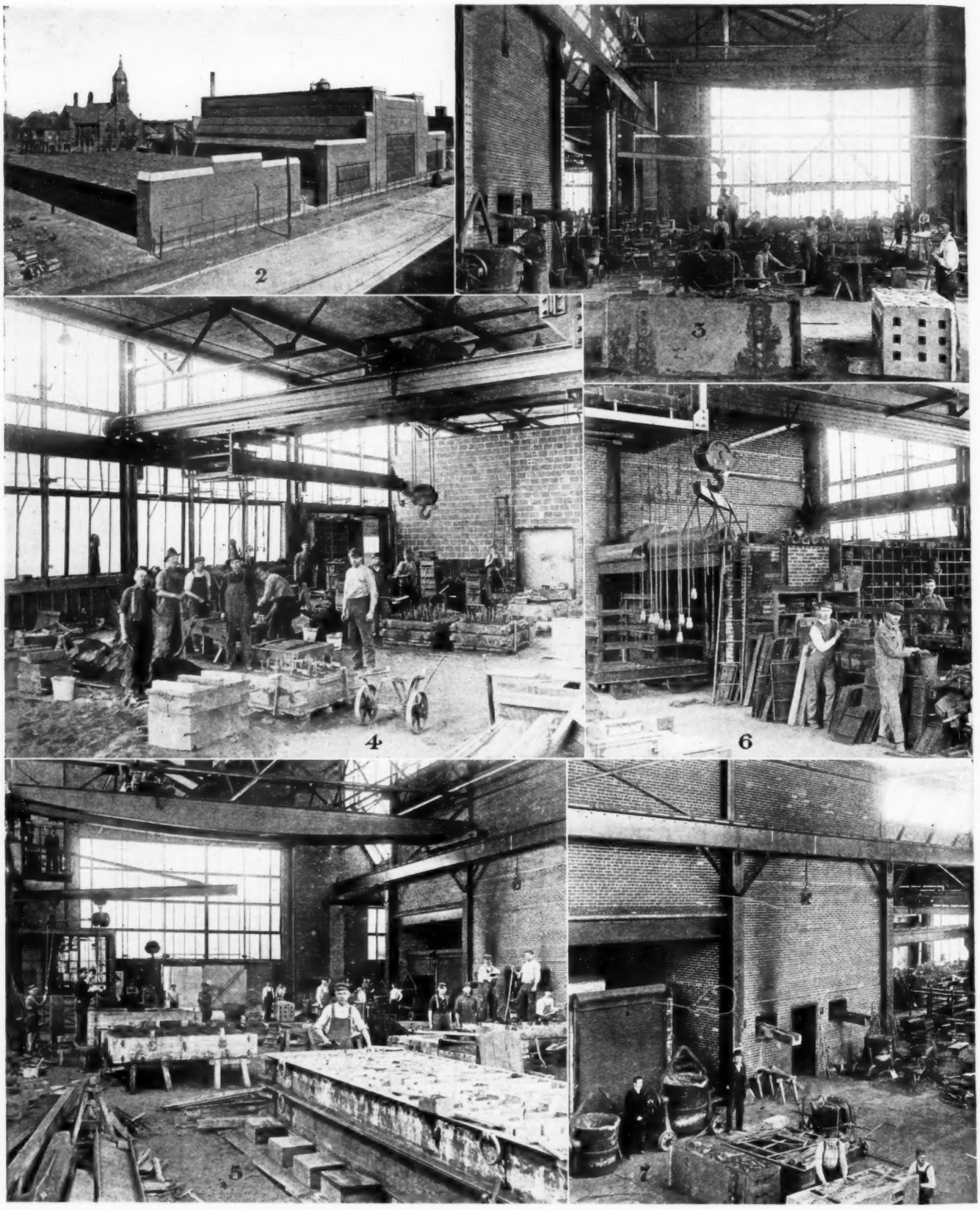
1. A modern foundry building has been erected, embodying the best practice in such construction, as to production methods and labor conditions.
2. A definite and successful effort has been put forth to train the unskilled men in the foundry, instead of hiring such men from the outside.
3. A small town location brings the advantages of close co-operation between management and men, with sufficient homes for the workers and other benefits not present in large city manufacturing localities.

Since a great variety of work is done by this organization, quantity production methods are not practicable, but the arrangement is such that maximum production is obtained for the work in process. Sixty-five men are employed in the foundry, twenty-six of whom are molders of more or less skill. Six core-makers are employed, while the remainder comprises apprentices, helpers and manual




1—*Ground plan of foundry.*

# Working in a Modern Foundry




*2—Exterior view of completed building. 3—Main molding section, showing concrete floor. 4—Side bay with overhead floor-operated crane. 5—Close-up view of concrete molding pits. 6—Core room and core ovens. 7—Cupolas and ladles*

laborers. The foundry is designed for a production of 20 tons of castings daily, ranging from small castings to those of 16,000 lb. weight.

Both exterior and interior present some interesting suggestions for foundry construction and production practice. An accompanying photograph shows an exterior view. The building is of a modified Pond type of truss construction. The windows being entirely of wire glass, a maximum of light is permitted to enter on all sides, but the direct rays of the sun are so diffused as to do away with glare. The best possible ventilation is provided, not only because of the extensive window area, but because of the top hung operated sash which makes it possible to have comfortable ventilation on wet as well as on dry days. When windows open on the side, as they generally do, rain and and snow are permitted to enter and interfere with the work. With the method employed in this foundry, however, excellent ventilation is provided both in inclement and fair weather.

It is important that the ventilation of a well-constructed foundry be properly regulated if a maximum of benefit is to be derived from the improved conditions. To do this is not difficult, once the right way is known. The average foundry foreman, however, cannot be expected to know the rules of ventilation; consequently, the architect of this foundry instructed the foreman in the correct methods of ventilation and the workmen themselves are not allowed to adjust the windows or heating apparatus in any way. As a result, the gas and dust, which are generally found where this class of work is carried on, are removed immediately after they have been generated, leaving a clear and pleasant atmosphere even during the time of greatest working activity.

### Building Construction

The building is fireproof, the foundation being of reinforced concrete, the walls of brick laid in cement and mortar, and the roof of monolithic gypsum. The gypsum roof construction was used in preference to concrete because experiments conducted by the architects, the Clement A. Hardy Co., showed that the former material conducted heat much less rapidly. That is, in regard to heat conduction it was found that the following proportion is approximately true:—gypsum: concrete as 1:3.

The floor plan shown in Fig. 1 illustrates the production possibilities of this foundry. Fig. 2 is an exterior view. The diversity of work prohibits quantity production methods, as previously stated, but the foundry is designed so as to reduce hand labor to a minimum. The entire foundry has a concrete floor, this being an innovation in foundry construction. A view of the floor is shown in Fig. 3. The concrete floor has many advantages over the old dirt floor and has proved practicable in use. Some of the chief advantages are:

1. Cleanliness. One sweeper constantly at work is able to keep the foundry floor practically as clean as that of a machine shop, thus making better working conditions and increasing efficiency.
2. Trucking facilities. All material is handled on small electric trucks. Thus rapid and effective shop trucking eliminates much cumbersome manual labor.
3. A level surface is provided upon which the molders work. This increases the accuracy of the work, reduces the amount of spoiled castings and raises the general quality of material produced.

All material is unloaded from the railroad tracks into the storage bins. Separate bins are provided for the different types of material. In transporting the material from the bins to the main foundry, electric elevating trucks are used. Sand, both for molding and core-making, is handled in this way. The work that cannot be handled on these electric trucks is transported by overhead electric cranes. The main molding floor is cared for by a 10-ton overhead crane. In addition, a three-motor floor operated electric traveling crane is located in each of the three foundry bays, one of which is shown in Fig. 4. Fig. 5 is a close-up of one of the two large concrete molding pits, located on the main molding floor.

The core department occupies one bay, as shown in Fig. 6. In this place the cores are made and are then carried by a crane into the core ovens, which are located in the corner. In a second bay, small castings are molded, while the third contains equipment for the manufacture of brass castings.

### Cleaning and Chipping

There are two centrally located cupolas. These are charged from above. They are shown in Fig. 7.

The cleaning and chipping room is located at the southwest end of the structure and is entirely separated from the main portion of the foundry. Four tumblers are in use there, while some eight or ten men are employed in chipping. When the work is in full operation, the air is as clear in this room as in the average machine shop. This is accomplished by the connection of a dust arrester to the tumblers. Thus, all the dust arising from the tumbling operation is immediately removed and carried outside. It has been found, moreover, that this process of removing dust is advantageous, not only from the standpoint of working conditions, but also from the standpoint of cleaning the casting rapidly. Since the dust is immediately removed, the castings are thoroughly cleaned more quickly.

The foundry is heated by a direct low pressure steam system, so arranged that a steady temperature of about 55 deg. is maintained, even in the coldest weather. Portions of the heating arrangement comprise some novel ideas in foundry heating practice which were installed by Paul A. Dratz of the Clement A. Hardy firm. The technical details cannot be given in a short general article of this kind but, briefly, the innovation consists of the installation of considerable radiation near the top of the building. This is on the theory that the air near the top must be warmed before the entire building is heated. Usually this is accomplished by convection or radiation, but in this installation, it is by direct heating. The new system had its test during the coldest days of last winter and not only proved successful from a heating standpoint, but showed an exceptionally low operation cost.

### Low Labor Turnover

The foundry foreman and the executives are "sold" on the practical productive benefits of good foundry conditions. "I have worked in foundries," the foreman said, "where you couldn't tell a molder from the sand pile, and I know the effect of bad conditions. My experience here proves that the good working conditions in our new foundry are a great help to production, even as compared to our old foundry, and it was not nearly as bad as many of them."

The low labor turnover at the Defiance foundry is very definitely affected by the excellent working conditions. These conditions are encouraging men to come into this plant to learn the molding trade. Every molder in the shop was trained there and a number are now in the process of learning. The practice of taking men from neighboring regions where they usually have a home and family is also influencing the stability of their labor. Nevertheless, it is believed that, unless the working conditions and opportunities were as good as they are, great difficulty would be experienced in getting men to come in as apprentice molders.

# Sales Entry into the Foreign Markets for Automotive Equipment

**A recent review of the automotive factories of the United States revealed that few of them have formed export departments and that special export literature and dealers' aids are largely lacking. This article shows how foreign trading may be undertaken, outlining some first steps.**

FOREIGN trading is beset to-day with so many difficulties that it should be undertaken only after careful study and intelligent preparation. This would seem obvious, but it is becoming increasingly apparent that many American firms consider their export sales as nothing more than a mere phase of their business, a part that is to be accepted if offered under favorable circumstances.

Such a spirit is in direct contrast to the successful foreign policies of a number of the home factories. These concerns—and their export business is in keeping with their aggressive methods in the home markets — are placing their products in every part of the globe, skilfully, profitably and to the great credit of American industry. These firms are the leaders, just as they are among the most successful in the domestic field, and to follow their footsteps would be no more than walking a trail that already has been blazed.

But, to get back to the firms which have not adopted such careful policies, it may be said that they appear to consider their export department as nothing more than a stepchild. Such a department, perhaps, is in existence, headed oftentimes by an official who carries the title of export manager. Frequently, however, the department is entirely lacking and the post of export manager is filled by whatever official of the sales department happens to receive the correspondence or pick up the request of the foreign buyer. Literature other than that for the domestic market is lacking, the overseas sales policy is undetermined or weak and the chances are that the business is passed along with little or no consideration for its continuance or for the future of the account.

The export department should stand alone, if foreign trading is to be attempted with any idea of success and profits. The field and the possibilities are sufficiently big and important—likewise the profits justify such handling—that the division should be a separate unit of the organization, headed by an executive who has sufficient authority and financial backing to undertake the work in hand.

The fact that numerous American manufacturers—not only of cars and trucks but of tractors, accessories and other equipment as well—have considered such sales as incidental to their general business is revealed by any study of the subject. Few of these firms have even an export staff, the number having prepared special sales literature and catalog in any language other than English is small, and many of them have not taken even the trouble of protecting their trademarks and copyright names in any country outside of the United States.

What this means, in dollars and cents, is that such firms are failing to take advantage of potential markets. Nearly 70,000 American-made passenger cars were exported in 1919 and the early months of 1920 saw more than half that number shipped from our ports to the foreign countries of the world. Wherever the American car has gone, there should go American-made equipment —speedometers, piston rings, carbureters, lamps, air compressors, gasoline fillers, garage equipment and parts of every description. Likewise, these cars should be followed up with trucks, tractors, motorcycles and, indeed, airplanes. The blazed trail should not be left in solitude.

**FOR the purpose of assisting our distributers and dealers to build up their organization and to introduce to them the most effective methods of conducting their business, this corporation now has three sales representatives traveling in Latin America. We believe that their services are of incalculable assistance to our selling organization throughout that important part of our territory.**

**We are attaching herewith a copy of catalogs and folders on the ——— car, which we have prepared in Spanish, Portuguese and Italian, for the use of our sales organization in Latin America.**

*—From a recent letter explaining in part the South American policy of a large car exporter.*

But, most frequently, these markets are allowed to shift for themselves. The parts makers have gone after the business in only a few instances. Recent business letters concerning export business to South America, as an example, drew forth the reply from many firms that this business was not being pushed. It was being handled, naturally, when offered, but catalogs and sales literature in Spanish, Portuguese or Italian were almost entirely lacking. A few of the car and truck builders had prepared such publications, some of which were exceedingly well gotten up, but the parts makers were conspicuous by their absence from this showing of enterprise. The business was left largely to shift for itself.

If a reason had been sought, it probably would have been that production was so difficult that the equipment could not be diverted from outlets in the United States or that the troubles in connection with transportation and credit were such that the business could not be attempted. In some cases, the business might not have offered sufficient proportions, firm by firm, to afford proper returns for the necessarily high expense of sending salesmen and working up merchandising organizations in the countries under review.

On the other hand, there is business to be had all over the globe. It is there to-day and it will be there to-morrow—for the firms which go after it. Some concern will land this business and only those which go after it will avail themselves of the profits.

In the same connection it should be said that export business cannot be undertaken and gotten under way in a few days, or even months. The problems of production, transportation and credit are, comparatively speaking, of an immediate nature. They will not be with us forever and the future will see these factors regain a normal condition. There is time to-day to build the foundation and to lay the cornerstone for export business; the forehanded firm of to-day will reap the profits of to-morrow.

### The First Steps

Several methods are possible in starting the business. The first and most profitable is, of course, to send executives and salesmen into the territories to be chosen. Let them arrange for distributers and dealers just as they would in the United States. The representative should have broad powers. He may be 3000 miles from home and communication with him may require weeks. On the other hand, he should not act hastily and offer the account to any one who will take it. The rule in that regard is the same as it is at home—an unsatisfactory dealer will do no more business in South America, Europe or Australia than he will in the United States.

If the firm and its product are sufficiently large, factory branches should be established in the chief centers of the various districts. That is really the big and most promising method of getting into foreign business. It puts the firm into the field with both feet, it insures direct representation and, if the proper men are chosen, it means that the line will be pushed in a way that it would not otherwise.

The next method is a combination of firms, perhaps joining together under the provisions of the Webb law, if competitors. This act has been almost totally ignored by the automotive industry and inquiries elicit little evidence of its consideration by such firms. Under it, or under any other justifiable combination, several concerns band together for the prosecution of their foreign business. An export corporation is formed jointly and it arranges its own sales organization, undertaking the sending of salesmen and representatives into the various countries, the appointment of distributers and entire conduct of the business.

The third method which is the one followed by a large majority of automotive concerns, is to turn over the line to an exporting agency. Such an agency generally handles numerous lines and charges for its work a percentage on the sales totals. It attempts all details of the business, even so far in some cases as financing and extending credits to the foreign dealer.

### Time, Effort and Money

As said before, export business cannot be undertaken on a hit or miss policy. It requires time, effort and money to work it up. Expenses of a foreign traveler undoubtedly will be higher than in the United States and business in the foreign field cannot be conducted on such narrow margins as at home. Communication is slow and difficult. Local conditions are different and change the trend of selling.

In this regard, the actions of one of the New York exporting houses may be cited. The company, specializing in certain lines, had been selling to South America for several years and was well informed on local conditions. Several months ago it was realized that a market must exist in those countries for automotive accessories and several lines were offered when the company announced that it might add such a division. However, all such business was refused until a thorough investigation might be made and the conduct of the new business determined. One of the members of the firm—not a mere representative but a vice-president—packed up his traveling bags and trunks and started for South America on a six months' trip, to look over the territory so that he may take up the business properly, and until he returns the department is practically in abeyance.

This reveals something of the problems involved in entering such a market. The expense of investigation may be imagined easily. The importance of the mission likewise can be visualized when it is remembered that one of the vice-presidents was detailed for the trip.

A blanket plan to cover world trading will not work out. Conditions vary in each country and in sections of the country itself. Language, customs and business methods vary and these factors must be considered in planning the selling. The start should be made in a limited territory, with expansion from that as conditions of production and sales warrant. One well known car maker has found it necessary to limit his sales to four countries, believing that careful cultivation of those few markets will be more profitable than would be the spreading of his line over a greater number. Other companies, with larger export allotments, cover greater territory, but each endeavors at least to keep up continuing shipments into the countries it has chosen. An ill-advised entry, without additional output to take care of the business, will result in financial troubles having a greater significance than the immediate sale involved.

### Following the Trail

The parts maker and seller has only to follow the lead of the more aggressive car builders in picking out his export markets. Month by month, the figures are published showing the shipments of American cars, trucks and tires to the various countries of the globe. With these in mind, it becomes a sales problem to realize where the accessories and other equipment should follow. International banks, business organizations and the governmental trade reports will reveal then something of the possible outlets, and it is a question of follow-up in landing the business. However, this seems to have been overlooked by a majority of the American makers and they are allowing much of this business to fall by the wayside, either undeveloped or assumed by the exporters of foreign countries.

It is obvious that a foreign dealer should be provided with literature and catalogs in his own language. The Ford company has translated its service manual into eleven languages; others of the larger companies are not far behind, and those concerns which make a real effort at foreign selling are "on the job" in this matter of furnishing dealer aids in the language of the various countries.

Parts makers should have this literature, in greater or less quantities. Five languages, it is considered, will cover a majority of the world, these being English, Spanish, French, Italian and Portuguese. Containers, likewise, should be gotten up, not merely a reproduction of those used at home, but to meet the various conditions that may be met. For instance, many such containers carry the price mark in dollars and cents, which, of course, would not be applicable to Australia or South America. Many countries have a dollar currency but, when freight, customs and costs are paid, it becomes impossible for the dealer to sell the product at the same price as it would be in the United States. Yet, if the dollar price remains, he must ask his customer a higher figure than is on the box.

So many factors enter into foreign salesmanship that books might be written about it. But suffice it to say that the successful exporter is the one who goes after the business carefully and with concern for the future. Half-measures will not avail and immediate profits do not build for the future.

# The Attitude of the Automotive Industry on Highway Construction

**In this address before the Highways Group of the Chamber of Commerce of the United States, Mr. Chapin plainly stated the position of the industry he represented toward this question so vital to vehicle manufacturers. But this position will avail nothing unless members of the industry get behind this position to push it and develop it themselves.**

By Roy D. Chapin*

IN discussing the highway problems of our government to-day, I want to take you back to 20 years ago and have you remember road conditions at that time. Generally speaking, the highway simply led from the town into the country. The motor vehicle was hardly heard of and when you set out with a horse your radius of action was usually limited to 20 miles a day. The average trip over the rural road probably was not more than four or five miles.

To-day you step into your motor car and your radius of travel is limited only by the condition of the road. From 150 to 200 miles in a day is easy over a good road. Motor trucks make regular runs between points 100 to 125 miles apart.

It is my purpose to show that the 2,500,000 miles of American highways have suddenly become a most important link in the whole country's transportation system. The present heavy traffic over our roads, both passenger and freight, was not anticipated by any of us ten years ago. Who can predict to-day with any accuracy what that traffic will be in 1930?

Transportation is a fundamental basis of our civilization. We must help mold this new and wonderful vehicle of transportation and the road-bed over which it moves so that we secure maximum benefits for ourselves and our children.

### Millions for Highways

Our government has embarked on the expenditure of hundreds of millions of dollars for highways. No longer are these expenditures a question of engineering or construction only. They have become one of our great economic problems, tied up intimately with our whole means of transportation and none of you but will agree, with our recent railroad experiences, that we need every increase possible in our means for moving freight and passengers. Center your thought on the fact that highways and highways transport are economic problems and, henceforth, we must deal with them on this basis. A road is of no value, however well built, unless it is used. Therefore, unless we promptly organize our federal administration of highways to secure maximum returns, not only will we be lacking in the transportation demanded in the near future, but we will waste so many of these millions on inadequate roads that it will be difficult to secure further construction funds.

The era of great railroad expansion is over. Highways and highways transportation hold the center of the stage. Let us organize for the future just as we would organize any big business, with ample power and deep appreciation of the economic problems involved. The times call for new methods and new plans, for the war has changed the entire future of our highways.

### The Department of Agriculture

Under the present Federal Aid Law, the government administers its appropriations through a subordinate division of the Department of Agriculture. The powers granted are few and, as those with experience at Washington know, it is impossible for any subordinate division of a department efficiently to administer as great a highway development as we suddenly find before us. This is no criticism of the Secretary of Agriculture or the personnel of the Bureau of Public Roads. They are limited by the law. Highways were placed under the jurisdiction of the Department of Agriculture in the days I mention when our roads simply led from farm to market. No subdivision of any department can give the attention to this subject that it deserves. The time has now come when an independent branch of the government should be set up whose sole duty it is to take over present governmental highway activities, centralize them, and administer them with a true vision of the future of highways transportation.

Therefore, let us ask Congress to provide for the future before it is too late. Exhaustive study has indicated that a commission composed of representatives of the various geographical sections of the country and clothed with adequate authority can furnish the administration required. It can do more than this. Unhampered by departmental restrictions and with a broad enough personnel to be truly representative of each section, it can not only demonstrate to the nation the types of road that should be built and that will last under the new traffic, but it can analyze this new traffic and help direct it so that it may attain its maximum efficiency as the great new link in our country's transportation system.

During and since the war, the limitations of the Bureau of Public Roads have been most apparent. In spite of an excellent organization now in charge of that office, its location under a governmental department will never permit our American highways to fulfil their destiny. Move this organization bodily if you please and, with the addition of the membership of a Federal Highway Commission, give these men full scope to treat with

*Mr. Chapin is president of the Hudson Motor Car Co.

highways and highways transportation on the basis of a sound business organization, reporting annually to Congress and the country on this subject alone. You would not be content to see the railroad problems of the country administered under the Post Office Department or be made a subordinate administration of any other department. Therefore, we must realize the urgent need of quick action in securing an administration that will be sufficiently effective to cope with these extraordinary developments and will protect us as well from the waste of hundreds of millions in inappropriate types of highways to the entire discredit of our road-building program.

### The Taxpayer

Remember that the taxpayer will only continue to vote appropriations and pay taxes for highways if he is convinced that he is getting value received. Is the government getting value received for its present highway appropriations? Emphatically, no! The feeling prevails in Congress that federal funds must produce national results. Federal taxes are paid only for this purpose. The present Federal Aid law calls for a dollar expended by each state on roads for each dollar given to that state by the government. The law does not restrict these expenditures to national highways, and what is the result? In some states the federal funds are appropriated pro rata to the counties. In but few states has federal aid resulted in a true system of state highways, and these state highways are only intrastate in character since they rarely have been connected with the main highways of other states. Are these roads of benefit to interstate commerce, to the general welfare, or to the common defense, the criterion from which most governmental expenditures must be analyzed? In isolated cases, the answer is yes. In the main, federal funds have been given to roads which do not properly comprise a federal system and a heavy portion of the expenditures so far have gone into roads that will need to be rebuilt almost immediately, or have already been rebuilt.

What should be done is to permit the federal, state, and county governments to select those roads of most importance from their own standpoint and let each improve and maintain those roads so selected. We should have national highways built from federal funds. This will release state funds for state construction and county funds for county construction. Appropriations will not be scattered haphazard as under the present system. This federal policy would insure maintenance and would not permit anything but a durable road. Certainly no effort would be made to take all or any part of the work away from the state highway department save that of location as long as the state highway department is efficient. Here we have a system similar to that of France, where, until the war came, practically every road and by-way was passable 365 days of the year and carried the traffic at a minimum of cost.

### Maintenance

Outside of construction, we must never overlook the point of maintenance, which in most states has just come to be regarded as of equal importance with construction. Our present Federal Aid law distributes federal funds to forty-eight separate state highway departments, but specifically says that government funds are to be expended only for construction purposes. You will hardly call this sound economics.

Returning to my statement that the government should construct and maintain roads of interstate importance, the best definition which I have seen of these roads as well as the best expression of the entire situation from a standpoint of national policy, is written into the bill introduced in Congress by the Hon. Charles E. Townsend, chairman of the Senate Committee on Post Offices and Post Roads.

Mr. Townsend would provide for a Federal Highway Commission and for government construction and maintenance by such commission, of a national system consisting of two main highways in each state and not exceeding one per cent of the mileage of highways in that state, save where necessary to connect such highways with similar roads in adjacent states or neighboring countries.

These roads would be constructed to connect the principal centers of agricultural and industrial production, to lower the costs of distribution, to facilitate interstate commerce, to strengthen the common defense and to provide the nation with a second line of transportation in times of emergency.

In those states or counties where roads which would naturally become part of a national system have been adequately constructed, they would be taken over and a compensating mileage of connecting or correlating highways would be constructed by or at the expense of the national government.

The actual work of construction and maintenance would be left to the state highway departments, since it is to the advantage of the government to utilize the excellent organization of many of these departments. The work would logically be decentralized just as it is today through regional district engineers and the state highway departments would be left free to devote their funds to the construction of feeder and state highways.

### The Townsend System

Of course such a system as that suggested by Mr. Townsend would be adequately constructed, but more than that the policy, as pointed out already, would be of economics, of a due regard for future traffic as well as present, in order that roads so constructed would not have to be torn up or replaced almost as soon as laid down. Such a policy would mean wide highways, heavy bridges, in fact the best construction throughout.

Further, one fact should be kept clearly in mind. There are to-day more than 7,500,000 motor vehicles on the highways and byways of our country. The number will be increased by the millions from year to year. Thirty million people ride over our roads every day. Thus you will see that highway transport touches the lives of every one of our citizens. Its constantly increasing importance in the economic and social fabric of our existence requires a national vision and administration and expenditures in proportion.

It is not too much to say that American industry and science have forged a powerful new weapon in the motor vehicle which will some day, not far distant, bring about a quiet but none the less potent revolution in American life, as well as in life in other countries.

It is the duty of our government that this revolution should have an economically sound basis and should be carried out under proper federal guidance with a dollar's worth of highways for every dollar expended. We cannot let the present inadequate law bring discredit upon the whole highway movement and set the brakes on the development of this new and vital mode of transportation.

On that day when passage of the necessary legislation by Congress provides proper highway administration and a federal system, the national life of our country will receive an impetus beyond the vision of any of us. Let us recognize the mistakes of the past and pledge ourselves to a clear and forward vision of the future.

# Profiting from the Scrap Heap in the Automotive Factory

**The disposition of the waste material that accumulates in a large or small manufacturing plant, particularly in the automobile industry, calls for care, intelligence and skill. In many plants, its importance has been overlooked and the scrap is allowed to take care of itself. This article should aid in correcting the large and frequently unnecessary losses so involved.**

By William Crawford Hirsch*

A COMPARATIVE survey of the manufacturing trades, with reference to the conservation and utilization of the scrap which accompanies their production, reveals the automotive industries as the pacemaker in that direction. Nearly all of the automotive plants have special departments charged with the salvage and disposal of scrap.

Every one of the commodities which come within the scope of the generic description of waste materials—scrap iron and steel, scrap metals (non-ferrous), scrap rubber, scrap leather, old paper, rope, bagging, etc.—are highly useful. The very essence of a sound doctrine of manufacturing economics is the principle that, far from being waste, even the most insignificant by-product has a value.

There are manufactures in which the utilization of certain by-products is still a problem for chemical or engineering research, but, in the automotive industries, there is an outlet for every single item of scrap, for every retired tool and for every piece of lumber and paper in which bought materials were contained. In short, street dust is the only legitimate rubbish. While the groundwork for intensive reclamation of scrap and other by-products has been laid, this has been chiefly in the direction of technical progress in the reutilization of these commodities in plants that are so self-contained as to permit of this method of pressing these secondary products back into service.

It is obvious that plants operating their own brass foundries remelt the cuttings from sheet brass, just as cast iron scrap finds its way into the iron foundry department. But there is, however, still much room for improvement in the simple task of organizing the collection of scrap and other discarded material that cannot be reused in the plant itself and in disposing of it in a rational manner. It is to stimulate thought and action along this line that the writer presents here observations based on many years' study of the so-called waste material industry in the capacity of editor of its business paper.

What is known as the waste material industry is, in fact, the commercial traffic in scrap iron and steel, scrap metals (non-ferrous), scrap rubber, textile clippings, rags, old paper, disused bags and bagging, scrap leather, and wool and cotton waste. As at present constituted, this industry leaves out of consideration the actual producer of these commodities. When it speaks of the producer, it refers by no means to the industrial plants whence emanate certain kinds of scrap, but of the purchaser of this scrap from the industrial plants. In its trade parlance, collection from primary sources is production. Prices for scrap quoted in market reports are invariably prices at which large dealers will buy from smaller dealers, never the prices that are paid to actual producers of scrap. In like manner, as the real producer of scrap, the ultimate consumer is ignored in the waste material industry's councils.

During the war, under pressure from the army and navy, even the red tape of established commercial usage had to give way at times and it happened that some of the scrap steel supply came directly to the steel mills from the actual producers of the scrap. But to-day we are back again where we were prior to the war, and, before scrap reaches a steel mill, it has passed frequently through the hands of half a dozen dealers.

It is true, however, that much scrap calls for grading and sorting before it is fit for re-use. Much of this can be done by the actual producer, if he has a properly equipped department. The scrap dealer is not without his usefulness. Many plants produce scrap in too small quantities to enable them to sell it advantageously direct to the consumer and even the largest plants produce certain kinds of scrap in such light quantities that an agency for collection, such as that furnished by the scrap dealer, is an economic advantage, but, for all that, the road to real progress lies along more direct contact between the large producers of scrap and the large ultimate consumers.

The writer has seen scrap going out of a certain plant and shipped to a dealer whose yard was located several hundred miles distant only to come back to a foundry within walking distance of the producing plant. Such economic waste cannot endure and the time is certain to come when the producers and consumers of scrap will be brought in closer touch with one another. Thus will be obviated the real waste in the waste material business.

Coming down to consideration of the actual methods to be followed in the automotive industries, it should be noted that any attempt to standardize a system of scrap collection and storage would prove abortive, as everything depends upon the individual characteristics of the plant. It is, however, possible to lay down broad rules for guidance. Whether there is a separate salvage and storage department or whether the purchasing agent is charged with the duty of making the scrap produced yield as great a revenue as possible, the average shop foreman must not be depended upon to devise or supervise scrap conservation. The general plant superintendent or manager of manufacturing must delegate disciplinary powers to the person entrusted with the responsibility of seeing to it that nothing goes to waste.

If this task is added to the many others which the pur-

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chasing agent shoulders, the advice of John Pauly, purchasing agent of the American Bosch Magneto Corp., Springfield, Mass., holds good. "It devolves upon the conscientious purchasing agent," Mr. Pauly admonished his fellow purchasing agents some time ago, "to get right out into the shop and to suggest, but ultimately demand, observance of scrap regulations." The individual mechanic, too, can contribute much toward a better yield from the scrap heap.

The primary division of metallic scrap is ferrous and non-ferrous. When iron gets into brass scrap, the latter is as much contaminated as is milk by water. The ferrous scrap must be divided into cast, which is for foundry use (malleable cast forming a separate subdivision in this category); wrought, which is for rolling; forgings, which can be used for crucible, electric and other process steel, heavy steel parts and tires as well as springs which are used by steel mills, and light iron and steel, such as stampings and sheet remnants. Cast iron borings and machine shop turnings should be religiously kept apart. When mixed, they are worth $1.50 to $2 a ton less than otherwise. It is impossible to give within this article anything like details regarding the various grades of iron and steel scrap. Suffice it to emphasize that all the different kinds of iron and steel scrap resulting from manufacturing in the automotive industries should be kept separated as much as possible. For the smaller scrap, such as borings, turnings, punchings, shearings, and forge flashings suitable containers should be provided, conveniently placed so that the scrap drops into the container from the machine or machine tool. Some operations do not permit of this and in such cases the resulting scrap must be periodically gathered and placed in the receptacle provided for it.

At the end of the day's work these receptacles are conveyed to the central scrap storage plant. There they are emptied into large bins. Heavy pieces, such as castings fractured in machining, are sent directly to the central scrap storage place and stocked in sections properly staked out for that purpose. Rigid supervision is necessary and frequent inspections of the bins and sections is advisable. In the absence of specialized knowledge as to the various kinds of scrap, it is best to stick closely to the policy of storing likes with likes, and with likes only. This is especially advisable in these days of alloy steels. A certain kind of manganese steel scrap may bring a much better price by itself than if it were mixed with ordinary carbon or other kinds of alloy steels.

When machine tools are beyond repair and it is decided to scrap them, they must first be separated into their constituent parts. Those which are made of high speed tool steel call for special care, as this scrap is worth many times the market price for ordinary steel.

Non-ferrous scrap is separated first as to its metallic character. Separate receptacles must be provided for copper, brass, aluminum, bronze, and zinc. Castings must be kept apart from millings, borings, turnings, and chips. Turnings can be used for castings, but filings or grindings would be lost in the furnace, so these different shapes of scrap form new subdivisions, each calling for a separate receptacle. Cuttings and clippings from brass or aluminum sheets must also be kept separated, if they are to bring the best possible price. Some alloys, such as that known as Tobin bronze, contain a small percentage of iron, and, when even a chip of this gets into ordinary brass or bronze, the value of the latter for casting is deteriorated.

When the operator on a machine tool shifts from one metal or composition to another, care must be taken to brush away every vestige of scrap remaining from the first metal before the second is taken in hand.

Brass rod scrap can frequently be sold back to the mill which sold the rods in the first place, but if the rod brass is mixed with cast scrap, its value has been lost and it can only be sold for foundry purposes. It is good policy to make classifications as narrow as possible. If possible, a brass containing 70 per cent of copper and 30 per cent of zinc should be kept separated from one that contains only 60 per cent of copper and 40 per cent of zinc. The reason is obvious. In a high copper market, the former may be worth several cents a pound more than the latter.

It depends entirely upon the scrap production of the individual plant and upon the extent to which it is self-contained in its manufacturing organization, as to what should be the equipment of the central scrap department. In large plants, a shear for cutting up big pieces of iron and steel scrap will be found useful. Where much in the way of sheet scrap results, a baling press is almost a necessity. In any event, in both ferrous and non-ferrous scrap divisions, it will be found profitable to provide the necessary equipment to reduce assembled parts into their constituents. If any of the original parts can be re-utilized in the plant itself, this sundering of the different components is an unavoidable preliminary, and, if the scrap must be sold, it will be found that it will bring a much more satisfactory price if so dissected.

Aside from a centrifugal oil separator, a magnetic separator is an essential in the equipment. If the latter is operated by a man who is on the alert, the non-ferrous scrap will be freed from every vestige of iron or steel. A crusher for the foundry scrap and possibly a special cinder crusher by which foundry sweepings can be sundered from foundry mud are indicated in plants operating their own foundries. In such establishments the installation of briquetting machinery is also frequently profitable. By means of this equipment, the scrap department is enabled to furnish to the foundry metal that will not only come up to the latter's requirements but which will also make possible the utilization of fragments that would otherwise go to waste through oxidation.

Scrap, other than metallic, is relatively easy to conserve. Common sense dictates the organization of the methods to be followed in husbanding it and in disposing of it. Rubber scrap is divided into standard tires, heavy beaded tires, stripped and badly worn tires, tire peelings, solid motor truck tires, inner tubes, compounded inner tubes,

**THERE is a use for everything. If an accident happens to a quantity of glass windshields so that they can be no longer used for that purpose, they can be cut down and sold to a manufacturer of small size mirrors and, if they should have been smashed into smithereens, the cullet would still represent a certain value for the making of new glass. There is a dealer in Milwaukee who specializes in leather and rubber belt remnants. Old rope is much sought after by paper makers. There is a well-established market for battery plates and battery mud. Incandescent lamp bases are eagerly sought by platinum reclaimers. Scrap mica is used in the manufacture of lubricants and wall paper. There is a large market for celluloid scrap and from this it may be inferred that nitrocellulose products of all kinds can be used in the industries that re-utilize celluloid scrap. The supreme law of finding the best possible market for scrap of all kinds is: "Seek and ye shall find!"**

red inner tubes, mechanical rubber, matting and packing. Scrap rubber dealers and reclaimers sub-divide these again into several grades of quality.

Insofar as the collection and storage of scrap are concerned, the same principle of separate compartments for each kind of goods holds good. Strips of burlap in which tires and other commodities are packed should be conserved with as painstaking care as a faulty bushing or bearing.

### Non-Metallic Scrap

One of the untoward conditions encountered, even in the large automotive plants where well-organized salvage departments are in operation, is that interest lags when it comes to scrap other than metallic. This is perhaps pardonable because scrap metals not only furnish quantitatively but also in monetary yield the biggest item in the list. But that is no valid reason why leather and even imitation leather remnants and cuttings, which have a certain value, should not be equally carefully gathered and preserved.

If a worn-down grinding wheel is permitted to go to waste, the discipline of conservation is lowered just that much and the next item thus flung away may be a valuable one. It is for this very reason, if not for its at present high intrinsic value, that well-managed plants insist upon the conservation of every scrap of waste paper. Just now every pound of old paper is sorely needed to help over the alarming shortage in that commodity but, even when old paper sells for one-half its present price, the spirit of conservation is fostered by its scrupulous collection and preparation for reuse in a baling press.

The motive of orderliness in the plant and that of eliminating the fire hazard as much as possible, furnish, of course, the incentive to much in the way of gathering material. As for its collection in the various shops of a plant, it matters little what the motive is, so long as it reaches the central scrap station, where the first duty consists of storing it where it belongs and the second of disposing of it to the greatest possible advantage.

It is the marketing of these scrap accumulations that calls for the greatest ability. Any man with the least talent for organization can lay out a workable plan for the methodical collection and storage of scrap, suitable to the special requirements of the plant that employs him. If he be a novice, he has a certain amount of literature to guide him, at least as to the character of iron and steel scrap and scrap metals. Aside from a book on the subject of scrap metals published last year, there is fragmentary information to be obtained in Government reports. In a brochure on "Brass Furnace Practice," published by the U. S. Bureau of Mines, there are several enlightening chapters on the recovery of metal from waste materials.

### Selling the Material

But when it comes to turning scrap accumulations into cash, sales generalship of the highest order is called for. Nearly every scrap dealer, when he is in the mood to unbosom himself, will tell of this or that instance when he bought some discarded piece of machinery for old iron or steel and when he came to take it apart he found that it contained "several tons" of copper. They usually "stretch" the amount of copper discovered, but, when it is borne in mind that copper is worth about $400 a ton and scrap iron only $25, it will be readily seen what the unwary seller is up against, unless he makes it a point to know the composition and the uses to which any article he sells to a scrap dealer may be put equally as well as the buyer.

The man who has charge of the selling of a plant's scrap must indeed be a man of parts. In the first place, he should know the history of the scrap which he has for sale and it is for this reason that in even some of the largest plants the purchasing agent who buys the new metals is charged also with disposing of the scrap. He has the advantage of knowing what he bought, and this is at least some aid in selling that part of the original metal which comes forth in the form of scrap. Where physical conditions are such as to permit of the accumulation of large quantities of scrap before they have to be disposed of, it is possible to obtain the guidance of average analyses made either in the plant laboratory or by an outside metallurgist. Many of the large producers of scrap find such analyses very helpful but at the same time the majority refrains from selling on the basis of an analysis because they have found through experience that if a buyer wants to go back on his word he can squirm out by a claim that the result of a test made with the sample which he took yielded a somewhat different analysis.

The plant official charged with the disposal of scrap must be an all-around scout, constantly on the alert for the best avenues of turning scrap, other than metallic, to the best possible account. In metals, the procedure is relatively easy. The same is true of scrap rubber, which is sold either to a dealer or to a reclaimer, and of old paper, cardboard, etc., as well as small strips of burlap, which are disposed of through a dealer to a paper mill. The quest for the right sort of buyers becomes more difficult when we get away from these fields and into such specialties as genuine and imitation leather remnants.

### Suggestions for Guidance

The ideal method of disposing of scrap of all kinds is to sell it to the manufacturer who re-uses it. This ideal, however, is in many instances unattainable. Even large automotive plants produce an insufficient quantity of certain kinds of scrap to warrant direct transactions with the consumer. In many instances, however, contact between the producer and consumer is merely artificially barred through the egoism of the intermediary dealer.

When scrap must be sold to the dealer, it is well to follow the methods of the railroad and street railway companies. They send out lists to a large number of dealers, informing them of the quantities and kinds of scrap they have for sale and inviting bids. Thus competitive offers are received and the highest bidder is awarded the material, provided his bid is in keeping with the market and his reputation for fair treatment good.

Transactions with dealers should always be on a cash basis, preceded by a deposit before the goods are shipped or delivered. There should be a clear understanding as to what weights are to govern—rail shipments can be weighed by the railroad company and truck deliveries by a sworn weigher. Nothing, if possible, should be left to later adjustment. If the material is sold on analysis, the terms of the list asking for bids should state so clearly, if "as is," it should be clearly stipulated. Nor should the terms of delivery—i.e., f.o.b. plant, f.o.b. cars or f.o.b. destination—be omitted. Standing agreements or annual contracts on a sliding scale or on the basis of a certain set of market quotations are always more or less risky but at times made necessary by lack of space for the storage of scrap for any length of time.

The all-important rules to bear in mind, however, are:

1. Save and store systematically every kind of scrap.
2. Re-use in your own plant every pound of scrap that you possibly can.
3. Find a consumer, as close to your plant as possible, for the scrap that you cannot use yourself.
4. If you must sell to a scrap dealer, be certain that you obtain the top price of the market and that the contract offers no loopholes for evasions or disputes.

# Manufacturers Realize the Importance of Local Service Men

**Equalized rates and trade discounts to dealers and repair shops were discussed at the second post-war convention of Factory Service Managers, held at Indianapolis by the National Automobile Chamber of Commerce.**

MEETING at Indianapolis, on May 24 and 25, the factory service managers held their second post-war convention, the attendance being even better than that at the Detroit convention last November. The convention was held under the supervision of the Service Committee of the National Automobile Chamber of Commerce. This organization has been in existence for some little time, but only within the past six months has it begun to function actively. The factories represented in the national body have found that service is such an important figure in the automobile industry that machinery has been set in motion to pursue actively the ideal in this branch, and these conventions have been held to bring the truth to light.

Among the most important thoughts brought out was the lack of contact between the factories and the local service stations in the past. This is a condition that is fast being remedied but there is still much work to be done. Heretofore, the factory service manager has, in too many instances, been chiefly concerned with supplying parts to the dealers and distributers and has paid too little attention to the real needs of the local men.

Special tools came in for a good deal of discussion and it was somewhat of a surprise to learn that of the delegates present, only two stated they were carrying a complete outfit of special tools. Some were carrying a fairly complete outfit and were working to get the lists complete. Two manufacturers had done nothing so far but said that the matter was receiving attention.

The use of special tools is so important that it cannot be overestimated. In most cases, the local man has had to make his own or go without. A change is promised in this matter.

Flat rate plans for retail service received somewhat of a setback. Percy Chamberlain's paper was attentively heard, but the sentiment seemed to be more strongly against the flat rate system than at the last meeting. Many of the delegates spoke of experiences with the plan, saying that it was not fair to the owner and that the overhead on the constantly changing rates was out of the question. Chamberlain refutes all of these arguments and he has had considerable success with the system himself, so the question is still in the air. It is probable that only extensive trial will prove which is the best system.

The servicing of parts of units for assembled cars and trucks occupied considerable time and was brought up in connection with the adoption of the Standard Service and Repair Parts Policies. It seems that, owing to lack of a definite system or agreement, parts for car and truck components are sometimes handled both by the car or truck dealer and by an independent house, perhaps representing the parts manufacturer or perhaps not. The price on an individual part may vary as much as 400 per cent and a variation of from 50 to 200 per cent was found to be quite common. The methods of selling, distributing and bookkeeping are principally responsible for such discrepancies. The car owner is beginning to learn of these differences and is getting dissatisfied with his findings.

There were cases cited where local dealers of partly assembled cars and trucks had not given the right kind of service on the components, leaving it to the local representative of the component manufacturer. That has made it necessary for the owner to go to three or four places to get different cars fixed and, if there happens to be dissatisfaction with the service or a shortage of parts, there is no one to whom to appeal. Everybody has shifted the duty of servicing this car to someone else. Either a better policy in such service must be adopted by the car or truck assembler or else the parts maker must be able to supply adequate service on his parts. F. E. Moskovics, vice-president of the Nordyke & Marmon Co., stated that his firm had long ago found out this evil and that it had reduced arbitrarily the prices on assembled parts to such a point that what the dealer had to charge would be on a par with the rates of the parts manufacturer's local agent.

On the subject of discounts, it was generally agreed that part of the discount was supposed to take care of service, both of the free variety while it lasted and also on the replacing of defective parts. The manufacturers realize that it is impossible to put out a 100 per cent perfect product and that there will be some defects in material and workmanship. When such parts are returned to the factory for credit, the local service station is by virtue of the aforesaid discount to supply the labor to put in those parts.

Thomas F. Snyder, secretary of the Transportation Department of the Indianapolis Chamber of Commerce and secretary of the Indiana Warehouse and Transfer Association, although not on the announced program, contributed some information on unwise truck selling. He stated that owing to the congested freight situation, many men of small capital had sought their fortunes in moving freight by truck. Some of these had bought trucks of 1½, 2 and 3½ tons capacity, on time, and had mortgaged their homes to make the first payment. Snyder said that these trucks had proved wholly inadequate for the service and that they would not pay. The result was that the trucks were either turned back to the dealer for non-payment of installments or else the owners loaded them to a point where they broke down and the service departments had to rebuild them. Snyder said that such service to make any money required a truck of at least 5 tons capacity.

The garageman has long struggled to get a trade discount on car and truck parts and has not altogether succeeded. Last November, the subject was brought up for discussion and was generally considered not advisable, as

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# France Seeks Legal Power to Force Labor Conciliation

**Interruption and delay of production has been almost constant in that country since the Armistice and the new laws, recently introduced but not yet acted upon, would compel the submission of all collective differences to arbitration bodies. Interesting reactions, particularly as regards the radical organization, are expected to result from such legislation.**

By Harry Tipper

SINCE the Armistice, France has suffered severely from the succession of strikes and from the reaction after the war pressure. Already badly hampered, from a production standpoint, by the destruction of man power during the war and the loss of the devastated area, this country has been suffering interruption and delay almost continuously since actual hostilities ceased.

The situation has been complicated by the fact that many of the labor bodies are affiliated with the socialistic wing and strikes have been called for political reasons in a good many cases and not especially because of industrial grievances. Moreover, the radical socialists have threatened strikes in connection with questions relating to the treaty and other matters concerned with the terms of peace.

Sufficient time has elapsed now for the majority of the people to desire a return to more normal conditions. The irritation which has been growing, particularly against the political strikes, has found expression in the introduction of a bill into the French Chamber which proposes to amplify the old law concerning conciliation and arbitration. This law was dependent upon the voluntary submission of the question to arbitration by employers and workmen.

The new law compels the submission of all collective differences which have arisen in an establishment or in groups of industry to the conciliation procedure organized in the same law. The only establishments omitted from the action contemplated by this bill are those employing less than twenty workers. The first article of this compulsory arbitration law states that there shall be no concerted stoppage of work either on the part of employers or employed before the end of the compulsory conciliation procedure. Most of the other articles govern the rules for the discussion between the parties and the outside intermediaries, of which it may be worth while to quote article 15:

> **"If the two parties decide to resort to arbitration, in order to settle their differences, each of them designate one or several arbitrators, which may be chosen from among the members of the conciliation committee. If these arbitrators cannot agree, they themselves designate a third arbitrator. In case of failure or agreement on the designation of the third arbitrator, the latter shall be designated by the first president of the Civil Court, in case the matter in hand interests only employees within the limits of the same Arrondissement; by the first president of the Court of Appeals, if the difference interests employees in several Arrondissements comprised within the jurisdiction of a Court of Appeals; by the first president of the Court of Cassation, if the difference interests employees within the jurisdiction of several Courts of Appeal.**
>
> **"In each case where the difference is submitted to arbitration, any collective stoppage of work is forbidden during the period of the arbitration proceedings."**

This indicates the use of the courts for the purpose of designating the arbitrators. Finally, the penalties for neglect to submit to this law are determined and the right of requisition is fully outlined, the right of requisition being reserved in every case.

Of course, this bill is being opposed by the central labor body, and particularly by the socialist wing in the Chamber. Just as in other countries, the leaders of the labor unions are not in favor of apy laws which will curb their power to interrupt industry and destroy the processes of distribution. It has ceased to be a weapon for calling attention to grievances, and has become a weapon for the enforcement of the demands of the leaders who are concerned in many cases with the introduction of a new social organization. The political character of the labor union bodies in France and the number of economic activities of the state itself have defined the aim of the labor leaders politically to an extent not observed in the United States. This introduces an entirely different situation; for instance, a strike was called by leaders among the seamen of the principal French ports for twenty-four hours as a protest against the action of the Government in delaying amnesty for the mutinous seamen in the Black Sea.

When the interruption of industry by the workers, or the interruption of distribution, is used for political purposes of the kind, it becoms a clear issue whether the workers are to formulate the laws and policies of the country according to their demands and by force, or whether the country is prepared to oblige the workers to submit their demands to some regular and orderly developments. Apparently the Government in France has arrived at the conclusion that it is necessary to enforce the settlement of the workers' demands through the regular machinery for arbitration and if necessary to oblige the workers and employers to continue working until the decision has been made. This implies the acceptance of the decision by the

parties at interest or the employment of the force at the hands of the Government to oblige the parties to submit. Of course, this law relates equally to employers and employees, and it specifically mentions a number of key industries where the stoppage of work must not be tolerated on account of the menace to the interests and health of the nation.

**It is interesting to observe that in Russia, where the dictatorship of the proletariat was established, it has become necessary to conscript the workers in order to provide some industrial and distributing necessities. In fact, this French law will do the same thing. In both cases, the action is due to the necessity of continuing distribution and production if the population is to be maintained with the necessities of life.**

Under these circumstances, the objection to this law by the radical socialists and the radical labor leaders in France must be recognized as an objection not so much directed against the principles involved in the law as against the government itself, and no action by the present social organization would satisfy them. This is evident because the more radical of these leaders have expressed their sympathy with the Russian Government from time to time and have objected to the action of the French Government in respect to Russia more than once. A number of them openly espoused the Russian idea of government by the proletariat and, of course, they are therefore willing to agree to the Russian movement in conscripting the workers.

This French bill and the reaction against it which has been caused in the radical ranks, illustrates more than anything which has come up the absurdity of these radical leaders of French labor in their tirades against the present system of government. They declaim against the reactionary character of this legislation and, in different parts of the same article, denounce it as autocratic and laugh at it as futile.

**We have pointed out a number of times that the tendency to autocracy in labor circles was quite marked and particularly so when they became affiliated with politics. In the case of the more radical of the European leaders of political labor organizations, it is not a question of autocracy or democracy and the words mean nothing when they are used in this connection. It is a question as between a new social organization controlled by the leaders of the proletariat and an orderly development of the present social organization with a larger measure of attention to the requirements of the whole population.**

It will be interesting to watch the developments which take place in the working out of this law, provided it is finally put into action. There will be some resistance to this provision and its immediate result may be a larger amount of difficulty. The extent of this difficulty will measure the strength of the radical movement in France more than anything which has occurred, and the success of the government in meeting this situation will be of importance to all countries where the radical developments have become visible.

So far, compulsory arbitration has not been considered seriously because it has been found difficult in democratic countries to secure the means of enforcement and to find a government which would willingly embark upon the difficult road of enforcement in such cases. The leaders of the labor bodies in France say that this bill is futile because it cannot be enforced. Future developments will indicate to what extent this is or is not the case. They will also indicate definitely the character of the social developments which are likely to take place in that country within a measurable time.

# Manufacturers Realize Importance of Local Service Men

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the factories and their representatives wanted to control the service on their vehicles. Sentiment seems to have undergone a change in this respect and, after the reading of some correspondence with the Minneapolis Garage Owners' Association, in which it was complained that discounts could not be obtained in all cases, the following resolution was presented and carried:

There being an insistent demand on the part of the independent garage owners to be accorded a discount on repair parts, be it resolved that it is the sense of this meeting:

1. That such a policy, under certain local or geographical conditions, probably would be better owner's service.

2. That a discount be granted independent garages in such localities where a real need exists and where the garage can qualify as competent.

3. That the judge of need and competency be, in distributer territory, the local representative or dealer and in open territory, the factory.

Consideration of the time and place of the next convention gave Edward D. Pugh, of the Peerless Motor Car Co., the opportunity to invite the convention to Cleveland and the invitation was accepted. The time decided on was November.

Local factories were visited on May 26. The Marmon and Stutz plants were viewed in the morning and the Prest-O-Lite plant in the afternoon, the delegates afterward being taken to the Indianapolis Speedway to witness the elimination trials.

## A New Aircraft Starter

THE French have for some time been working on a compressed carbon dioxide starter for their aircraft. The design is that of the engineer Odier. The device is portable, but can also be included in the plane's structure. The portable type has a large, flat piece which carries the actuating mechanism and a brace. There is a piston with a plunger having a pulley at the end. A rope fastened at one end runs over this pulley and then around a drum. The slack end is kept taut by a spring. The drum has a hollow head with curved slots in the edge. These slots engage pins on the propeller hub. When the compressed gas is admitted to the cylinder the plunger is driven upward drawing the rope with it. This rotates the drum which is engaged with the propeller. When the engine starts, the speed of the propeller hub being greater than that of the drum, the pins disengage from the curved slots and the starter is cleared. This starter is in common use in the French Air Service.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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# Building for Future Sales

ATTENTION of manufacturers is respectfully called to an item of news that was printed on page 1184 of the issue of May 20. If you have not read this particular item, which refers to poorly finished cars, turn to the back issue and read it.

For a number of months, the dealer has been ground between the millstones of demand and supply. His customers have been shaking money at him and demanding cars. The factories have been rationing his supply and he has been taking any and all cars offered. According to this report—and this publication can vouch for its accuracy—the dealer has been spending his own money to put these cars into condition for use. His charge is that the factories have inspected the cars carelessly and that they show indifference toward the adjustment of claims for the work done. In some cases, more than half of the dealer's profit has gone into work that should have been performed at the factory.

It is strange that a factory having an eye on the future should permit such a condition to enter its trade. Such a plan is workable only during conditions like the present. There is a general sentiment in the industry that the time is coming when the dealer will have to sell his cars instead of letting persons buy them. When that time comes, naturally, the dealer will be more discriminating as to the car he offers to the public, and a good guess is that he will cut loose from the factory that took advantage of past circumstances. It would appear to be an obvious conclusion that the dealer who is well treated in the time of his trial is more likely to stand by the manufacturer when the latter is having sales troubles than is the dealer who has been neglected. There is much talk of building sales departments for the future. A splendid way to begin would be to treat the dealer fairly at all times.

# The Service Idea Applied to Labor Relations

THERE is a small city in the Middle West where forty-six manufacturing plants, each engaged in producing a similar article, have made their industry grow many times more rapidly than the municipal facilities. Housing facilities in particular have utterly failed to keep pace with the vast influx of workers.

Every firm in town is paying high wages, higher, probably, than any other community in that section of the country. The result has been that hundreds of men have come there to work, chiefly with the idea of getting the high wages, saving up some money and getting out of the town as rapidly as possible. It is easy to see what such a condition means to effective production and labor turnover.

Yet in the midst of this extremely unfavorable industrial situation, a very interesting and practical idea was expressed recently. The head of the labor department of one of the largest of these concerns said:

> "Our housing situation is, undoubtedly, very bad, but at the present time there is no possibility of finding a remedy for it. We have done all we can in that line for the present and are making plans for future development. In the meantime the thing for us to do is to create and foster conditions which will help to offset the housing shortage. Instead of sitting around and bemoaning the fact that there are no houses, we must provide exceptionally good working conditions, design means for making men interested in their work, giving them a real opportunity for advancement and personal development. We must cease laying emphasis upon all the bad points of the town, and design immediately possible and practical methods of making our plant, our company and our community attractive to the best type of workmen."

Automobile manufacturers are familiar with the meaning of service as related to the sales force. This statement expresses the necessity for emphasizing service, instead of merely price, in connection with

personal activities. In almost every industrial community to-day there are certain unfavorable conditions which it is impossible to eliminate immediately. Psychology teaches us that the only effective way to divert attention from an unpleasant thing is to center it actively upon a pleasant one. Consequently it is necessary that the management provide as many of those pleasant things as possible and then "sell" them to the workmen. The fact that they are provided will do little good unless they are sold. The old theory that every cloud is silver-lined can well be applied in a practical way. The idea of service must be developed in connection with labor relations as well as in connection with the sales force.

## Exporting in 1920

EXPORT trading, perhaps to an extent much greater than domestic selling, should keep an eye open to the future. Salesmanship that has only an immediate benefit in view often defeats itself, particularly so in the foreign markets where business is conducted at long range, with long waits between communications and with greater difficulties to the reaching of an understanding on matters of difference. Consequently, the factors of confidence and cooperation should reign in all export selling.

The present season is a great opportunity for displaying such qualities. With orders greatly in excess of supply and with transportation and deliveries a problem of the utmost concern, it behooves the careful exporter to exercise the greatest care in the conduct of his foreign trading. Strict attention must be given to every detail of the order—to filling it exactly as specified, to packing it properly, to billing it properly and to following up its shipment with every bit of ability possessed by the exporter.

An export shipment to-day, attendant as it is with every difficulty that can readily be conceived, should pave the way for more and more future business.

## Gear Standardization

IN the gear-cutting business there is evidently need for a standardization of terms and of methods of calculation used, and a commendable effort to obtain standardization in these items in connection with worm and helical gearing was made in a report of the worm-gear subcommittee of the A. G. M. A. Standards Committee presented at the Detroit meeting. Perhaps in no other branch of the gear industry is there such diversity of practice as in the worm-gear branch.

One of the first items that comes up is the pitch. In spur and bevel gearing it is customary in this country to use the diametral pitch system, whereby the number of teeth in a wheel is made an even multiple of the pitch diameter in inches. In worm gears, however, it has been found preferable to use the circular pitch system.

All of the elements of a worm gear can be represented in two different ways, depending on whether a section of the tooth is taken normal to the length of the tooth or in an axial plane of the worm. In the first place we get the normal circular pitch and in the second the axial pitch. The term "circular" applies, of course, only in the case of the worm wheel, because in the case of the worm the pitch is measured on a straight line. On the wheel the pitch is a simple fraction of the pitch circle circumference.

There is probably little to choose between the different methods of calculating tooth dimensions, but the essential thing is that the same method be used by all as far as possible, as this will facilitate discussion and tend to avoid misunderstandings. Incidental to the adoption of the circular pitch in the axial plane as the standard pitch would be the adoption of the method of measuring the tooth flank angle in the axial instead of in the normal plane. These tooth flank angles also require standardization. In spur and bevel gearing pressure angles of 14½ and 20 deg. are used, the former for the regular involute and the latter for the stub tooth. In worm and helical gears, if the angle is measured in the axial plane, it must necessarily be greater. In automobile worm gearing it is customary to make this angle equal to 30 deg., but worm-gear manufacturers specializing in general industrial work consider this unnecessarily large, and objectionable because it results in increased bearing pressures. The reason for using a large pressure angle is that it obviates undercutting of wheel teeth and facilitates grinding of worm. As a standard pressure angle for industrial worm gearing 22½ deg. has been proposed.

## Business and Government

THE Motor Car Dealers Association of Seattle is the latest to join the ranks of "Business and Government" advocates, having come out in support of William J. Coyle, its executive secretary, as a candidate for Lieutenant-Governor of Washington.

A veteran of overseas service, Coyle is not without experience in public service, having been connected for two years with the State Legal Department and having practiced law in his home state. Coyle himself says he has no particular hobby and is not a candidate of the automobile industry, having entered the race at the request of members of the American Legion.

Coyle's candidacy is another indication of the awakening of business men in the automotive and other fields to the necessity of more active concern in public affairs, both in the interests of their states and cities and of good business.

THERE are some newspapers and other publications in this country which are more or less concerned about stopping the production of automobiles to ease the transportation situation (so that these papers can more readily get white paper) and to check somewhat the buying of luxuries. But we must decline even to consider the arguments from this source until such newspapers see fit to decline automobile advertising, because the publication of such ads consumes the white paper so greatly needed for news and because these ads promote the buying of luxuries.

# California Behind On Gasoline Supply

## Rail Congestion and Increase in Cars Cause Restrictions on Purchases

SAN FRANCISCO, CAL., May 20—California is suffering to-day from a gasoline shortage which in some places is so acute that you can purchase only 3 gallons at a time. The shortage is more acute in Northern California, where there has been difficulty in some places in getting any at all. This is mostly in the rice growing areas. The present shortage does not give evidence of tying up automotive transportation on the Pacific Coast as the oil companies foresaw the coming shortage as far back as January and February and at that time began laying plans to meet it. The shortage exists from San Diego at the Mexican line right to the North, but varies in different places.

The switchmen's strike has been an immediate cause, but there are other reasons, the most important being that the increase in automotive apparatus on the coast has run ahead of the supply of crude and petroleum reserves in storage have been drawn upon very heavily for many months. Before the peak of consumption in July is over these reserves will be much more depleted. This year California will have to import 80,000,000 gal. of gasoline from east of the Rockies. In 1919 there were 20,000,000 gal. imported from the East.

The development of the paved highway system, to-day approximating 4500 miles of the finest roads in the country, has had a wonderfully stimulating effect on the sales of automotive apparatus. The increase of motor cars in 1919 was 33 per cent over 1918 and an increase of 25 per cent is expected this year over last year, which would be much greater were coast dealers able to secure shipments.

Dan Lee, Cadillac distributer for California, has 2000 orders with deposits on his books, which is practically a year's shipment. Two or three other companies are three and four months behind in deliveries, which fact will reduce the car increase per cent as compared with last year.

### Distillate Sounded Warning

Taking of distillate off the California market last January was the first intimation of the impending fuel crisis. Distillate, which was never marketed in the East, is a fuel that lies between gasoline and kerosene. A gallon of crude produced less distillate than it would produce kerosene and the withdrawal of distillate was to increase the available supply of kerosene. Since January tractors and trucks that used distillate have been and are still being converted to using kerosene by use of the ensign and other carbureting devices.

In February the crude oil production in California was 25,000 barrels less than requirements. California is drawing heavily on storage reserves. Since 1916 stocks have decreased 141,000,000 barrels and to-day the reserve of crude is but 30,000,000 barrels. Of this only 14,000,000 barrels are available for the market, with 10,000,000 barrels described as working capital, or merchandise on the shelf for sale, and the remaining 6,000,000 barrels in pipe lines or tank steamers and therefore entirely unavailable. In March standard prices were advanced two cents a gallon on gasoline and twenty-five cents a barrel on crude.

Each month sees the reserves still farther depleted. At the present rate of consumption and production the available reserves will be exhausted in 12 months. Those in the oil industry view the situation with alarm as the situation is not a temporary one, but rather the culmination of a steady growth.

(*Continued on page* 1284)

# Cars and Gas Makers To Compete for Fuel

NEW YORK, May 29—Increased competition for gas oil between the automotive industry and the gas companies of the country was predicted by N. A. C. Smith, chief of the oil division of the Bureau of Mines, at a meeting here of the American Gas Association to discuss what was declared to be the "critical condition of the industry." It was decided the only remedies were higher rates and priority in shipments of coal, coke and oil.

Smith declared the demand for gasoline undoubtedly would increase and that this would add to the shortage of gas oil.

"There was 7,500,000 automobiles and trucks in use in this country on Jan. 1," he said. "It is proposed to build more than 1,500,000 additional cars during 1920. At the present time there is difficulty in supplying enough gasoline to meet the demand, so it is not going to be easy to divert supplies of gas oil. The use of the oil engine is likely to increase. Thus the two largest competitors of the gas industry for gas oil are practically certain to become more formidable as time goes on.

"On the other hand the United States Geological Survey reports that the output of crude petroleum in this country has probably closely approached its maximum, and may soon begin to diminish."

### DOOMS CARS AS LUXURIES

PARIS, May 25—Adoption by the Chamber of Deputies of a provision in the tax bill placing levies totalling 951 francs on small cars has doomed automobiles as luxuries, in the opinion of owners of machines in this city. Efforts are being made to induce the Senate to change the bill in this particular, but there is little hope of success. In addition, owners of machines pay indirect taxes on gasoline which, even for cars driven an average of twenty miles per day, amount to 1,000 francs annually. Taking into consideration the tax on the purchase prices of automobiles, the cost of a car and its operation is double that of ten months ago.

# Boston Refinery to Save Gasoline

## Navy Awards Contract for Fuel Derived Under Process Which Cuts Costs

FALL RIVER, May 27—A plant is being built here for a new process whereby the output of gasoline from a given quantity of crude oil is increased. The new process also is said to eliminate waste and produce a finer variety of fuel oil.

The contract for the first 3,000,000 bbl. of the new oil has been awarded by the navy department to Cochrane Harper & Co. of 60 State Street, Boston. The fuel oil is one year's supply for Uncle Sam's oilburning battleships.

According to R. M. H. Harper of the Boston company the development in the oil industry results from the discovery of a new "cracking" process. "In the past," he says, "the navy has been compelled to use a 'Grade A' oil of such high quality that it could be supplied only by the fields in Texas, Oklahoma and Indiana. By the new process almost any oil can be refined to meet the navy standard.

"Heretofore the best bid that the navy could get for their fuel oil was $3.50. We can supply it at $3, and on top of this produce two to ten per cent more gasoline than under ordinary refining conditions.

"The new process cuts the refining loss to a minimum. In the past much of the oil has been burned up during refining."

### ITALY SECOND IN CAR EXPORTS

NEW YORK, May 28—The Fiat branch in this city has received information to the effect that the parent company in Italy is exporting two-thirds of its output and that there is every reason to believe this proportion will increase. Even with the completion of war contracts not one of the big Italian motor car factories has been converted to other uses, although they have been put on a peace footing. Italy now ranks next to the United States in the export of automobiles.

### TRUCKS SAVE FORESTRY SCHOOL

SYRACUSE, N. Y., May 29—Uncle Sam's army training in motor truck work saved the New York State College of Forestry at Syracuse from the emergency which developed when the railroad tie-up caused an embargo on all rail shipments. The college, about to open its summer camp in the western Adirondacks, found itself unable to ship supplies by rail. In this emergency the ship-by-truck method was resorted to for the shipment of tons of summer camping equipment over the worst roads in the state of New York to Cranberry Lake. Warren B. Bullock, director of forest extension, who was a captain in the Motor Transport Corps during the war, organized the expedition.

# Makers Must Meet German Competition

## British Buyer Tells Need for Immediate Establishment of Foreign Agencies

NEW YORK, May 28—An order for 1000 one-ton trucks has been placed with the Atlas Truck Corp. by Igal V. Roper, sales manager for Jameson-Foster, Ltd., South Shields, England, who has returned home after placing in this country contracts for $3,000,000 worth of trucks and passenger cars to be delivered as soon as possible.

Roper predicted that German motor car manufacturers soon would enter into active competition with American and British makers. English factories are producing as many cars as they can but are not able to meet half the demand. It is therefore necessary for dealers who desire to supply all their customers with the same make of car to come to the United States where quantity purchases may be made. The difficulty lies in selecting a proper chassis for the British market.

American dealers who are hesitating to establish foreign agencies at this time were warned by Roper that they may find it too late when they get around to it. He added that England and other countries should be considered only as additional states and dealers established there as quickly as possible even at the sacrifice of some of the domestic outlet.

### FINDLEY ON DETROIT BOARD

DETROIT, May 29—P. G. Findley, traffic manager for Dodge Bros., has been appointed as the shippers' representative on the Detroit terminal traffic committee, which will work under the direction of the Interstate Commerce Committee in trying to clear up the freight jam. The other members of the committee are M. Trump of the Detroit Terminal Railroad, and W. D. Anderson, representing the I. C. C.

### NOVO SHIPS TO FAR EAST

LANSING, MICH., May 29—Novo Engine Co. has just completed shipment of four carloads of engines and equipment to the Far East, one to the Philippine Islands, one to China and two to Japan. Shipment to the Philippines consisted of engines and hoists, that to China of air compressor outfits, saw rings and miscellaneous equipment, and to Japan chiefly engines with some complete equipment for use in the extensive road building program now being carried out in that country.

### G. M. C. EXTENDS PRODUCTS

GRAND RAPIDS, MICH., May 28—General Motors Co. will locate two new plants in Grand Rapids on a 62-acre site purchased early in the year. The erection of these units will begin development of the property by General Motors.

One of the new plants will be used for the manufacture of Frigidair refrigerators and the other for the manufacture of Sunny Home power plants. The Sunny Home is a 110-volt motor used to supplement the Delco system for home and factory use. The Frigidair refrigerator now is being manufactured under contract, the cabinets in Grand Rapids and the motors in St. Louis. The assembling plant is in Detroit. The company expects to have six plants in operation next year.

# Highway Council Aids Terminal Committees

WASHINGTON, May 29—The Federal Highway Council has sent a bulletin to its members urging them to keep in touch with the terminal committee appointed by the Interstate Commerce Commission and aid them in every way possible in unraveling the traffic jam on the railroads. It is proposed that special assistance be offered in the use of motor trucks and wagons in transfer service, releasing cars for long hauls.

### TO SELL SANDERSONS HERE

NEW YORK, May 29—Gerald France, a member of the British Parliament, has arrived in this country to establish agencies for the Angus Sanderson, one of the popular British cars, which sells in England for £575. The company has decided to set aside a liberal portion of its production for export. In its business in this country it will have the advantage of the exchange rate.

# Cement Association Urges Highway Needs

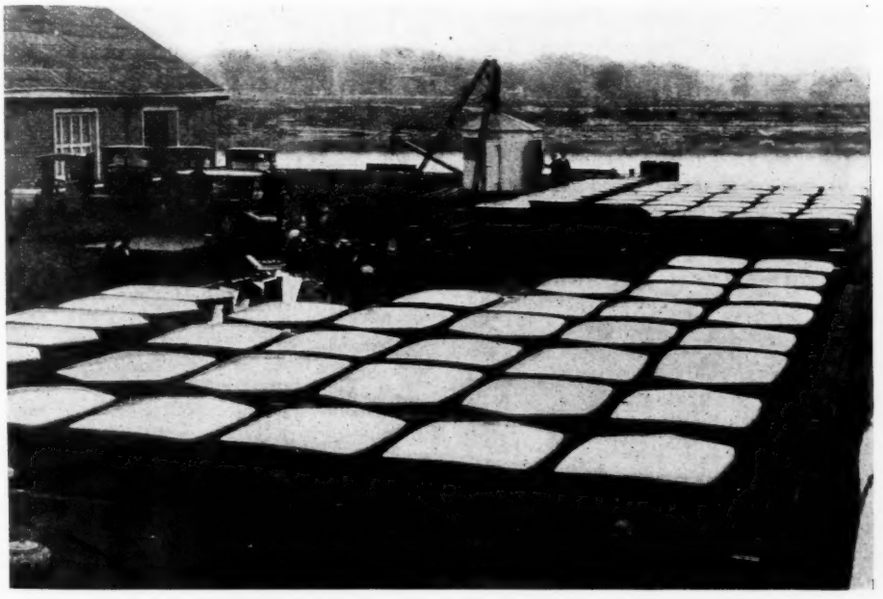
## Protests Against Shipping Discrimination When Roads Are Liable to Greatest Use

CHICAGO, May 29—The Portland Cement Association has issued a statement urging emphatic protest to the Interstate Commerce Association against any attempt to have cars refused for the transportation of road building materials. The statement says:

For the past two or three years highway programs have been either suspended or seriously curtailed. Such discrimination as that proposed should not now be tolerated, particularly because of serious or impending food shortages and also because of the relief which highway transportation has been to industry in handling much traffic which the railroads could not take. Bad as the railroad situation is at the present time, it is almost certain to be worse later when still greater demands will be made for cars for crop movement. If highway construction can continue without undue obstacles, many of the roads now in process of construction will be finished in time to afford greater relief to the railways, and to meet other demands that undoubtedly will be made of them by shippers.

Under these conditions it would seem more necessary than ever to emphasize the imperative need of continuing essential road work with all vigor instead of in any way curtailing or handicapping it.

***Franklin Bodies Arriving By Barge Canal***



*Because of the railway congestion the Franklin company has found it good business to route its incoming shipments over the New York State Barge Canal. The picture shows a $250,000 shipment of sedan and brougham bodies which arrived from Buffalo in four days. It was one of the most valuable shipments entrusted to the canal since its construction. With trucks and the canal in use for receipt of raw material, and drive-aways for delivery of finished cars and trucks, the company expects to maintain its set production schedule*

# British Air Rule Feared by Curtiss

## Dumping of Surplus War Material Will Stifle American Builders, He Says

NEW YORK, May 29—The gigantic scheme to dispose of thousands of discarded British aircraft by selling them at bargain counter rates in this country was explained to-day by Glenn H. Curtiss, pioneer aviator and inventor, as only one phase of a strategic campaign to make Britain mistress of the air. He said that if the British are permitted to monopolize the aircraft market throughout the world—as they are aiming to do to-day—the commercial aerial industry here will revert to the embryo state it was in before the war.

"We have learned that British manufacturers actually hope to gain such a foothold in other countries," said Curtiss, "that competition will be stifled before it has had an opportunity to develop. The biggest deal in aeronautical history was put through when the whole stock of the Aircraft Disposal Board of the British Air Ministry of Munitions was purchased by a syndicate of British manufacturers.

"They have now organized their selling and publicity staffs. It is a part of a prearranged program involving three separate features: First, the establishments of a civil department of aviation to encourage commercial flying; second, the employment of British pilots to keep them always in training and ready for flying; third, a comprehensive program for foreign business, even at initial sacrifice.

"Accordingly the syndicate has purchased from the British Government thousands of these machines that England does not want—bought them, I am reliably informed, at less than 5 per cent of the cost of construction.

"A corporation organized recently under the laws of Delaware is authority for the statement that British aircraft will be used. The press agents do not say that this material is the British military material, that it is already coming into this country—to be sold anywhere that a sale can be made. The advertisements vouch for that last statement.

"And they are being sold at bargain counter prices, the inducement lying in the price, not the quality, for any airman will tell you that military machines are not fitted for commercial work, especially when they are two or three years old. They are not equipped for commercial uses, for one thing.

"Once established in these markets the British manufacturers plan to continue supplying machines to the exclusion of domestic products, because by that time, if their plans do not miscarry or are not thwarted by quick action, the American industry will have been retarded sufficiently to put them out of the running as competitors in their own field.

"No industry on earth can withstand competition where the selling price is based on a mere fraction of the actual cost of production. Unless it is prevented, we shall be where we were before the war. America will have no commercial industry, except one struggling to keep open its factories and fill such orders as it may be fortunate enough to pick up.

"The remedy for all this is the immediate adoption of protective measures, quick, decisive Congressional action levying a tariff on these war machines that will cover the cost of production. We do not want to eliminate fair post-war commercial aircraft competition from abroad, but to prevent unfair competition which now threatens in the dumping into this country of all the disused machines that foreign nations do not want.

**Industry Liquidated.**

"To-day we find the American aircraft industry practically 95 per cent liquidated and employing about 2500 men. Our factories alone employed more than 25,000 men when the armistice was signed. To-day, after struggling against the most disheartening odds, we find that capital inevitably has gone into more profitable enterprises.

"American aviation is in a more critical state to-day than at any period in its history. I do not believe there are more than 1000 machines in use in this country to-day; that is, in actual commercial use, and by far the greater number of these consists of military planes salvaged from the surplus our own armies had on hand. Our factories are not operating at a fraction of their capacity."

### REJECT ANTI-DUMPING MOVE

WASHINGTON, May 28—The Senate to-day rejected Senator New's amendment to the army appropriation bill that sought to assess an equalizing import tax on foreign made aircraft to prevent the dumping of such equipment on the American market to the detriment of the home industry. The amendment was caused by the recently announced plans of shipping large quantities of British military machines into the United States which would be sold at a small fraction of their original value.

### ARMORED TRIPLANE A SUCCESS

DAYTON, May 25—During the week the new armored triplane designed and built by the Engineering Division of the Air Service, has been tested at McCook Field. The tests proved a great success. The craft is a LePère, equipped with two Liberty engines. Both engines and fuselage are completely armored. It carries 8 machine guns and a 37-mm. cannon. This plane is well equipped and protected for battle in the air at high altitudes or for straffing troops while flying close to the earth.

### E. C. McGRAW DIES

EAST PALESTINE, OHIO, May 28—News has been received here of the death at Miami, Fla., of Edwin C. McGraw, president of the McGraw Tire & Rubber Co. He came here 11 years ago from Pittsburgh, where he conducted a hotel.

# Performances Tame at Monaco Trials

## Savoia Racer Produces Only Sensation—One Plane Finishes Trans-Mediterranean Flight

NEW YORK, May 29—The recent International Seaplane Competition held at Monaco did not develop anything very new in the way of seaplanes, with the possible exception of the remarkable Savoia racer piloted by Signor Janello. The English Fairey-Napier was not flown as the pilot, Col. Nicolls, was called to this country one week before the race and no other pilot was found in time. This was the only English entry. There was never even a mention of any American firms considering an entry.

The speed race was held over a course involving two turns and a total length of 49.7 miles. Three machines took part, a racing Spad piloted by DeRomanet; the Savoia piloted by Janello, and a Spad-Canon piloted by Testa. The race was won by DeRomanet, who covered the course in 22 min. 51 1/5 sec. Janello 55 2/5 sec. later. Testa was forced to give up because of engine trouble. While De Romanet won the race, it is generally admitted that the Savoia is faster. Janello took his corners much too wide and so lost his advantage. In addition he was a few seconds slow in getting off.

The daily altitude prize brought out some very fine work from the French entries. Two reached an indicated altitude of 20,830 feet.

The transmediterranean flight came near to being a farce. The only competitor to complete the course was Ensign Bellot on a George Levy flying boat with a 250-hp. Hispano-Suiza engine. As he is a naval officer he could not receive the cash prize, which went to Sadi Lecointe as the civilian giving the best performance.

On the whole, very little of the great expectations was realized. The arrangements in every case were perfect. The French navy supplied a salvage tug equipped with a crane for lifting the boats from the water to the quay. Two destroyers patrolled the course to Tunis and every possible assistance was given to the civilians. De Romanet was even allowed to go to St. Raphaël to practice on a training seaplane, as he had never flown seaplanes before.

### BAKER GETS BODY CONTRACTS

CLEVELAND, May 29—The Baker R. & L. Co. has received a contract from Stevens-Duryea, Inc., Chicopee Falls, Mass., covering enclosed bodies for Stevens-Duryea cars for 1920 and 1921. Work has been started on the first year's order, amounting to $1,000,000. The Baker R. & L. Co. also has a contract with the Reo Motor Car Co. for bodies for 1919 and 1920. This contract, aggregating $3,000,000, is now nearing completion. The Baker company is also making bodies for the Rauch & Lang electrics now made at Chicopee Falls.

# Louisiana to Teach Automotive Farming

## Bill for State Agricultural College Provides for Department On Power Uses

BATON ROUGE, LA., May 28—The bill creating the new agricultural college to become a part of Louisiana State University, provides that one of the departments of the educational institution is to be devoted to instruction in the benefits and uses of automotive vehicles on the farm. The course in this form of engineering is to include training with tractors and trucks and other motor farm implements; electric lighting plants, refrigeration plants, portable motor sawmills, and similar modern equipment for facilitating agricultural work. Incidental to the study of trucks and their uses, will be considerable instruction on the building and maintenance of good roads, and comparison of truck shipment methods, economy and results as compared with shipment by horse-drawn vehicles, trains, and waterways.

With the training on the use of tractors will come specialized instruction in plowing and cultivation, depth of plowing for various crops, handling of tractors in rice and sugar fields, etc. Clearing of land by motor-driven portable sawmills, stump-removers and similar machinery also will come in as a part of the course. General driving and upkeep of automobiles and internal combustion engines also will be taught, with a period devoted to the use of the passenger car on the farm.

With approximately 5000 miles of navigable inland waterways in Louisiana, and a number of towns and agricultural sections whose connection with the outside world is by these streams and by artificial canals, one of the branches of this automotive vehicle department will be devoted to instruction in the handling of motor-driven boats and barges, of which there are some 2000 at work to-day in Louisiana.

The new bill, which will be passed by mutual agreement at this session of the state legislature, provides for a one-mill tax, yielding $1,500,000 a year, for the establishment and maintenance of the agricultural school as a branch of Louisiana State University.

### UNITED STATES DESIGNS TIRE

PROVIDENCE, R. I., May 29—The United States Rubber Co. has placed on the market after a long series of road and laboratory tests a new truck tire known as the Monotwin. It is a big single solid for heavy duty vehicles which will be made in sizes from 7 to 14 in. Its design is said to eliminate the chief cause of internal friction, the dissipation of frictional heat and more perfect vulcanization.

The Monotwin is built out of grainless rubber and the rubber and base band are chemically united to prevent base separation. Alternative cross bars and depressions are designed to give non-skid qualities. The bottoms of the depressions go below the point where the tire is worn to the limit of serviceability. Consequently it does not require regrooving. The shape of the depressions is such that stones cannot lodge in them. Unusual cushioning qualities also are claimed for the Monotwin.

## Growth of Truck Use Seen as Rail Result

NEW YORK, May 28—The *Iron Age* says this week in reference to the use of motor trucks in the Pittsburgh steel district:

"Improvement in freight movements has been slower than expected. Of the leading producing centers, greatest relief from the traffic congestion appears in the Pittsburgh district. The scattering of railroad workers to lucrative employment, in some cases with municipalities, is checking rapid resumption of the railroads, and the now heavy use of the motor truck for relatively short hauls promises to remain more general in the future."

## Questionnaire Shows Economy of Tractors

WASHINGTON, May 28—Statistics regarding the use of tractors have been obtained by the Bureau of Farm Management of the Department of Agriculture from 600 replies to a questionnaire sent to farmers in central Illinois. It is shown that with a 28 in. horse-drawn plow, one man accomplishes from 70 to 80 per cent more than with a single-bottom plow. One man with a 28 in. plough drawn by a motor tractor covers 30 to 35 per cent more ground in a day than does a man using six horses on a horse-drawn plow of the same size. A three-bottom plow drawn by a suitable tractor enables one man to accomplish from 60 to 70 per cent more than does the two-bottom plow drawn by six horses.

### ATLAS DIRECTORS CHOSEN

NEW YORK, May 29—The following directors have been elected by the Atlas Truck Corp.: A. R. Cosgrove, general manager of the company; Reeve Schley, vice-president Chase National Bank; F. M. Small, president Martin-Parry Corp.; Oscar Gubelman, banker; D. D. Sargent, vice-president International Motor Co.; John J. Watson, Jr., vice-president International Agricultural Corp., and Herbert S. Carpenter. Watson has been elected president and chairman of the board.

### COAST AIRLINE STARTS

SAN FRANCISCO, May 25—The airplane Avion arrived in San Francisco today, seven hours out from Los Angeles, in what was announced as the first trip of a regular passenger airplane service between the two cities. She carried six passengers and two pilots. At Bakersfield and Fresno the passengers disembarked for lunch.

# Packard to Build Lighter Model Car

## Single Six for Fall Production Will Meet Lower Cost Demand

NEW YORK, May 29—President Alvan Macauley of the Packard Motor Car Co. has made a report to the stockholders in which he says:

"About September next we expect to place on the market, in addition to the Twin Six, a new model Packard, the Single Six, which we have been working on for many years. It will be smaller, lighter and less expensive than the Twin Six and will meet a very widespread demand for a quality car at reasonable price.

"To finance the new car, provide inventory, tools and machinery for its production, capital requirements for the coming year are estimated at $15,000,000. As the company is not in immediate need of money, the directors will await an opportune moment to undertake whatever financing may be necessary.

"The directors have chiefly in mind the importance of maintaining the capitalization of the company on a basis which will enable them, as long as current earnings justify it, to pay cash dividends at a rate consistent with the intrinsic value of the common stock; at the same time they recognize the need of bringing about that wider distribution of Packard securities which is essential to financial strength."

## Emergency Committee Presents N. I. V. A. Views

CHICAGO, May 28—The National Implement and Vehicle Association has appointed an "emergency committeee" to represent the industry in all matters dealing with the larger questions involving the financial, labor, material and transportation situations. It is headed by H. M. Wallis. In announcing this action the executive committee said:

The present financial and transportation situation required, in the judgment of the committee, some immediate action, and it was decided that the committee or a representation from same go to Washington and present the views of our association to the Secretary of the Treasury and the Secretary of Agriculture and other officials and representatives.

### KELLY FACTORY PROGRESSES

CUMBERLAND, MD., May 28—Rapid progress is being made in the erection of the new plant here of the Kelly-Springfield Tire Co. of Akron. The total investment will be about $7,000,000 and the capacity of the factory will be about 5000 tires a day. Orders for mechanical equipment have virtually all been placed and barring unavoidable delays the plant will go into partial operation early this summer.

# Exports of Tires for March, 1920

| COUNTRIES | Automobile Tires | | | All Other Tires |
|---|---|---|---|---|
| | Casings | Inner | Solid | |
| | Dollars | Dollars | Dollars | Dollars |
| Austria | 19,943 | ..... | ..... | ..... |
| Belgium | 146,395 | 3,433 | 31,001 | ..... |
| Denmark | 50,562 | 13,545 | 34,451 | 1,154 |
| Finland | 19,998 | 2,400 | 9,680 | 20 |
| France | 590,748 | 44,290 | 12,150 | 11,027 |
| Germany | 108,123 | 607 | 11,143 | 10 |
| Greece | 36,995 | 6,909 | 3,409 | 186 |
| Iceland and Faroe Islands | 2,046 | 44 | ..... | ..... |
| Italy | 87,979 | 7,079 | ..... | ..... |
| Malta, Gozo and Cyprus Islands | ..... | 179 | 300 | ..... |
| Netherlands | 214,903 | 10,817 | 13,790 | 7,091 |
| Norway | 90,908 | 7,254 | 45,610 | ..... |
| Poland and Danzig | 16,872 | ..... | ..... | ..... |
| Portugal | 61,518 | 6,481 | 10 | 2,100 |
| Roumania | 100,683 | 16,434 | ..... | ..... |
| Russia in Europe | 1,148 | 168 | ..... | ..... |
| Spain | 128,413 | 11,146 | 15,794 | 2,587 |
| Sweden | 239,590 | 24,499 | 37,090 | 3,009 |
| Switzerland | 55,152 | 328 | ..... | ..... |
| Turkey in Europe | 5,589 | 1,999 | ..... | ..... |
| England | 483,775 | 124,988 | 10,073 | 4,126 |
| Scotland | 31,105 | 2,358 | 83 | 211 |
| Ireland | 629 | ..... | ..... | 7 |
| Jugoslavia, Albania and Fiume | ..... | ..... | ..... | ..... |
| Bermuda | ..... | ..... | 340 | 100 |
| British Honduras | 238 | 43 | ..... | ..... |
| Canada | 179,656 | 48,515 | 35,749 | 94,113 |
| Costa Rica | 1,868 | 55 | 244 | ..... |
| Guatemala | 4,269 | 1,142 | ..... | 1,050 |
| Honduras | 3,005 | 891 | ..... | ..... |
| Nicaragua | 1,191 | 323 | ..... | 436 |
| Panama | 22,026 | 2,538 | 13,831 | 1,352 |
| Salvador | 8,761 | 633 | ..... | ..... |
| Mexico | 73,635 | 16,928 | 5,234 | 1,202 |
| Newfoundland and Labrador | 812 | 157 | 214 | ..... |
| Barbados | 3,160 | 311 | ..... | 151 |
| Jamaica | 25,174 | 2,020 | 893 | 1,127 |
| Trinidad and Tobago | 15,235 | 2,134 | ..... | 1,306 |
| Other British West Indies | 1,392 | 266 | 369 | 466 |
| Cuba | 120,227 | 5,333 | 19,430 | 1,828 |
| Virgin Islands of the United States | 158 | 44 | ..... | 476 |
| Dutch West Indies | 2,956 | 765 | ..... | ..... |
| French West Indies | 1,901 | 774 | 1,080 | 146 |
| Haiti | 2,701 | 192 | 80 | 150 |
| Dominican Republic | 28,977 | 5,247 | 1,645 | 1,195 |
| Argentina | 188,783 | 38,218 | 721 | 577 |
| Bolivia | 407 | ..... | ..... | ..... |
| Brazil | 118,660 | 16,561 | 4,217 | 38 |
| Chile | 67,668 | 8,853 | 997 | 3,526 |
| Colombia | 10,993 | 3,178 | 413 | 744 |
| Ecuador | 1,992 | 495 | 602 | ..... |
| British Guiana | 4,871 | 1,106 | 250 | ..... |
| Dutch Guiana | 425 | 50 | ..... | ..... |
| French Guiana | ..... | ..... | ..... | ..... |
| Paraguay | 73 | ..... | ..... | ..... |
| Peru | 19,357 | 1,041 | 1,072 | 364 |
| Uruguay | 59,142 | 6,897 | 2,807 | ..... |
| Venezuela | 24,568 | 2,784 | 136 | 342 |
| China | 54,073 | 1,615 | 5,095 | 9,445 |
| Chosen | 2,935 | ..... | ..... | ..... |
| British India | 110,721 | 32,064 | 35,156 | 8,044 |
| Straits Settlements | 14,206 | 1,361 | ..... | ..... |
| Other British East Indies | 3,134 | ..... | ..... | ..... |
| Dutch East Indies | 92,678 | 19,298 | 74,265 | 648 |
| Honekong | 1,359 | 26 | 1,600 | 69 |
| Japan | 22,290 | 2,768 | 1,985 | 2,312 |
| Siam | 864 | ..... | ..... | 52 |
| Turkey in Asia | 1,887 | ..... | ..... | 346 |
| Australia | 82,093 | 3,526 | 7,506 | 1,688 |
| New Zealand | 110,546 | 14,493 | 5,700 | 11,966 |
| Other Oceania | 261 | 18 | 402 | ..... |
| Philippine Islands | 43,454 | 13,098 | 14,055 | 2,362 |
| Belgian Kongo | 388 | ..... | ..... | ..... |
| British West Africa | 50,792 | 6,264 | 270 | ..... |
| British South Africa | 117,577 | 17,003 | 2,012 | 971 |
| British East Africa | 2,292 | ..... | ..... | ..... |
| Canary Islands | 871 | ..... | 1,500 | ..... |
| French Africa | 1,720 | 182 | ..... | ..... |
| Portuguese Africa | ..... | ..... | ..... | 85 |
| Egypt | 19,460 | 1,410 | 14,694 | 896 |
| Total | 4,220,956 | 565,578 | 479,148 | 181,101 |

## G. M. C. DENIES SUSPENSION

DETROIT, May 28—Denial of various rumors that General Motors was planning to close down part or all of its units for a time and that a cut in wages was contemplated was made by General Manager George E. Hannum, in charge of the Saginaw units, following a conference with President W. C. Durant in this city this week.

"That is not a policy of General Motors," said Hannum. "General Motors does not intend to close any of its plants and it does not intend to cut wages. There is no foundation whatever for such absurd reports." Reports have been persistent about Detroit that General Motors units would be closed temporarily, and when reopened would start on a basis of a substantial reduction in wages. Hannum's statement applies to all units of the corporation.

## CONTINENTAL RING BUILDS

MEMPHIS, TENN., May 28—The construction of the Continental Piston Ring Co.'s new factory will be started at once. The company has outgrown its present quarters. The present capacity is 150,000 per month. This will be increased to 600,000. B. G. Covington is president and general manager; John Reidling, vice-president, and W. H. McCadden, secretary.

# Automobile Exports by Countries for March, 1920

| COUNTRIES | COMMERCIAL | | | | PASSENGER | | | | PARTS |
|---|---|---|---|---|---|---|---|---|---|
| | Complete Cars | | Chassis | | Complete Cars | | Chassis | | |
| | Number | Dollars | Number | Dollars | Number | Dollars | Number | Dollars | Dollars |
| Austria | .... | .... | .... | .... | 2 | 3,300 | .... | .... | 160 |
| Azores and Madeira Islands | .... | .... | .... | .... | .... | .... | .... | .... | 74 |
| Belgium | 6 | 7,732 | .... | .... | 168 | 190,512 | 16 | 33,238 | 24,716 |
| Bulgaria | .... | .... | .... | .... | .... | .... | .... | .... | 486 |
| Denmark | 33 | 74,842 | 21 | 41,359 | 157 | 182,180 | .... | .... | 133,020 |
| Finland | .... | .... | .... | .... | 1 | 3,500 | .... | .... | 147 |
| France | 30 | 116,218 | .... | .... | 58 | 114,887 | 5 | 1,815 | 446,294 |
| Germany | .... | .... | .... | .... | 5 | 8,400 | 1 | 2,500 | 1,096 |
| Gibraltar | 1 | 1,461 | .... | .... | 1 | 900 | .... | .... | .... |
| Greece | 3 | 7,900 | .... | .... | 83 | 119,776 | .... | .... | 17,721 |
| Iceland and Faroe Islands | 4 | 2,014 | .... | .... | 10 | 9,000 | .... | .... | 1,570 |
| Italy | .... | .... | .... | .... | 359 | 539,060 | 10 | 12,080 | 59,327 |
| Malta, Gozo and Cyprus Islands | 3 | 1,511 | .... | .... | 11 | 6,703 | .... | .... | 634 |
| Netherlands | 73 | 40,396 | 32 | 63,212 | 199 | 262,201 | 14 | 32,749 | 39,555 |
| Norway | 50 | 103,583 | 23 | 47,765 | 178 | 187,973 | 3 | 4,487 | 27,395 |
| Poland and Danzig | .... | .... | .... | .... | 18 | 11,912 | .... | .... | 2,178 |
| Portugal | 27 | 76,871 | 9 | 19,020 | 94 | 171,695 | 9 | 26,800 | 18,977 |
| Roumania | .... | .... | .... | .... | 24 | 20,450 | .... | .... | 806 |
| Russia in Europe | .... | .... | .... | .... | 50 | 39,650 | .... | .... | 1,045 |
| Spain | 62 | 98,297 | 15 | 28,967 | 234 | 203,995 | 6 | 4,767 | 196,656 |
| Sweden | 69 | 121,898 | 12 | 20,044 | 602 | 672,049 | 20 | 28,888 | 45,989 |
| Switzerland | 31 | 14,581 | .... | .... | 157 | 148,211 | .... | .... | 9,232 |
| Turkey in Europe | 3 | 9,900 | .... | .... | 31 | 15,653 | .... | .... | 2,140 |
| England | 323 | 504,837 | 245 | 332,743 | 1,721 | 2,087,385 | 230 | 267,373 | 2,822,549 |
| Scotland | 8 | 4,764 | .... | .... | 116 | 139,228 | .... | .... | 66,140 |
| Ireland | .... | .... | .... | .... | 153 | 172,552 | .... | .... | 2,969 |
| Jugoslavia, Albania and Fiume | .... | .... | .... | .... | 1 | 3,000 | .... | .... | 250 |
| British Honduras | .... | .... | .... | .... | .... | .... | 1 | 600 | 943 |
| Canada | 151 | 247,218 | 143 | 282,302 | 1,068 | 1,366,406 | 74 | 86,292 | 2,917,816 |
| Costa Rica | 1 | 2,700 | .... | .... | 11 | 14,319 | .... | .... | 2,881 |
| Guatemala | 2 | 4,612 | .... | .... | 25 | 32,400 | .... | .... | 5,300 |
| Honduras | .... | .... | .... | .... | 1 | 700 | .... | .... | 4,011 |
| Nicaragua | 3 | 4,299 | 3 | 5,750 | 15 | 12,304 | .... | .... | 3,059 |
| Panama | 4 | 6,474 | .... | .... | 27 | 23,027 | .... | .... | 4,769 |
| Salvador | 5 | 9,087 | 1 | 1,810 | 19 | 19,630 | .... | .... | 3,130 |
| Mexico | 77 | 108,909 | 18 | 13,788 | 214 | 182,260 | 3 | 1,500 | 82,598 |
| Newfoundland and Labrador | .... | .... | .... | .... | 6 | 7,000 | .... | .... | 1,779 |
| Barbados | 6 | 3,022 | .... | .... | 9 | 5,100 | .... | .... | 1,580 |
| Jamaica | 19 | 9,782 | 9 | 22,010 | 15 | 20,523 | .... | .... | 19,104 |
| Trinidad and Tobago | 11 | 11,442 | 10 | 24,169 | 115 | 75,889 | .... | .... | 11,032 |
| Other British West Indies | 3 | 2,007 | .... | .... | 15 | 14,144 | .... | .... | 3,743 |
| Cuba | 77 | 180,221 | 66 | 199,266 | 286 | 301,774 | 1 | 2,569 | 80,915 |
| Virgin Islands of United States | 3 | 10,950 | .... | .... | 5 | 2,100 | .... | .... | 1,697 |
| Dutch West Indies | 2 | 987 | .... | .... | 6 | 2,848 | .... | .... | 494 |
| French West Indies | 8 | 7,930 | .... | .... | 12 | 12,219 | .... | .... | 4,157 |
| Haiti | 4 | 2,015 | 1 | 1,634 | 30 | 26,416 | 1 | 350 | 11,207 |
| Dominican Republic | 13 | 9,376 | 1 | 588 | 46 | 35,945 | .... | .... | 12,284 |
| Argentina | 48 | 52,940 | 10 | 35,645 | 668 | 701,254 | 20 | 26,969 | 1,026,940 |
| Bolivia | .... | .... | .... | .... | 1 | 1,100 | .... | .... | 208 |
| Brazil | 218 | 124,760 | 19 | 21,545 | 772 | 598,742 | 12 | 9,849 | 82,938 |
| Chile | 7 | 21,271 | 2 | 4,960 | 21 | 39,676 | 4 | 1,768 | 27,336 |
| Colombia | 3 | 8,708 | 5 | 3,905 | 111 | 137,646 | .... | .... | 16,160 |
| Ecuador | 3 | 1,511 | 2 | 4,500 | 32 | 33,791 | .... | .... | 3,341 |
| British Guiana | .... | .... | .... | .... | 1 | 1,065 | .... | .... | 3,269 |
| Dutch Guiana | 1 | 500 | .... | .... | .... | .... | .... | .... | 1,314 |
| French Guiana | .... | .... | .... | .... | .... | .... | .... | .... | 108 |
| Paraguay | .... | .... | .... | .... | .... | .... | .... | .... | 1,023 |
| Peru | 305 | 198,845 | .... | .... | 129 | 87,491 | 1 | 1,180 | 40,570 |
| Uruguay | 4 | 4,710 | .... | .... | 480 | 443,099 | 1 | 1,268 | 66,180 |
| Venezuela | 31 | 22,937 | 5 | 6,051 | 116 | 68,749 | 1 | 650 | 15,482 |
| China | 5 | 7,703 | 2 | 3,653 | 59 | 91,269 | 3 | 6,195 | 9,540 |
| Chosen | .... | .... | .... | .... | .... | .... | .... | .... | 335 |
| British India | 131 | 233,883 | 69 | 102,898 | 1,858 | 1,979,151 | 22 | 21,215 | 161,305 |
| Straits Settlements | 13 | 27,165 | 10 | 15,581 | 140 | 151,610 | .... | .... | 26,887 |
| Other British East Indies | 3 | 5,390 | .... | .... | 24 | 24,364 | 4 | 4,345 | 8,339 |
| Dutch East Indies | 40 | 85,077 | 24 | 51,189 | 275 | 346,153 | .... | .... | 36,505 |
| French East Indies | .... | .... | .... | .... | .... | .... | .... | .... | 2,455 |
| Hongkong | .... | .... | .... | .... | 16 | 34,638 | .... | .... | 6,342 |
| Japan | 16 | 38,260 | 69 | 62,220 | 98 | 105,974 | 24 | 28,019 | 46,178 |
| Persia | .... | .... | .... | .... | 6 | 7,200 | .... | .... | 522 |
| Russia in Asia | .... | .... | .... | .... | .... | .... | .... | .... | 2,198 |
| Siam | .... | .... | .... | .... | 1 | 1,500 | .... | .... | 154 |
| Turkey in Asia | 1 | 2,000 | .... | .... | 55 | 49,918 | 4 | 2,865 | 2,718 |
| Australia | 40 | 65,220 | 58 | 77,314 | 195 | 244,528 | 352 | 371,310 | 92,058 |
| New Zealand | 8 | 19,197 | 10 | 20,992 | 484 | 499,592 | 21 | 25,572 | 97,876 |
| Other British Oceania | .... | .... | 1 | 2,330 | .... | .... | .... | .... | 2,970 |
| French Oceania | .... | .... | .... | .... | .... | .... | .... | .... | 138 |
| Other Oceania | .... | .... | 6 | 3,156 | 2 | 1,134 | .... | .... | 509 |
| Philippine Islands | 60 | 67,742 | 42 | 91,712 | 138 | 152,573 | 20 | 10,000 | 50,371 |
| Belgian Kongo | 8 | 5,120 | .... | .... | 17 | 10,750 | .... | .... | 1,018 |
| British West Africa | 42 | 57,306 | 24 | 60,975 | 31 | 36,050 | 12 | 18,112 | 31,256 |
| British South Africa | 3 | 7,100 | 7 | 16,647 | 914 | 1,041,138 | .... | .... | 140,719 |
| British East Africa | 1 | 3,000 | .... | .... | 5 | 3,740 | .... | .... | 13,530 |
| Canary Islands | .... | .... | .... | .... | 17 | 19,395 | .... | .... | 6,641 |
| French Africa | 14 | 18,065 | 4 | 10,490 | 56 | 43,294 | 2 | 884 | 10,501 |
| German Africa | .... | .... | .... | .... | 1 | 575 | .... | .... | 3,510 |
| Morocco | 18 | 9,066 | .... | .... | 97 | 58,716 | .... | .... | 441 |
| Portuguese Africa | .... | .... | .... | .... | 28 | 22,879 | .... | .... | 1,045 |
| Egypt | 5 | 3,315 | .... | .... | 2,251 | 237,868 | 1 | 525 | 8,601 |
| Total | 2,143 | 2,898,626 | 978 | 1,700,190 | 13,457 | 14,745,798 | 898 | 1,036,734 | 9,143,156 |

| SHIPMENTS TO NON-CONTIGUOUS TERRITORIES | COMMERCIAL | | PASSENGER | | PARTS |
|---|---|---|---|---|---|
| | Number | Dollars | Number | Dollars | Dollars |
| Alaska | 11 | 12,685 | 6 | 7,054 | 7,830 |
| Hawaii | 28 | 34,600 | 271 | 281,186 | 80,200 |
| Porto Rico | 25 | 46,947 | 70 | 88,172 | 18,128 |

# Holland Considers Ban on Solid Tires

## Roads Congress in Fall Will Decide Advisability of Truck Regulation

AKRON, May 28—Holland is seriously considering the advisability of following in the footsteps of Norway in proposing national legislation which will specify that motor trucks of certain capacity must be equipped with pneumatic tires so as to prevent damage to roads and to cut down excessive cost of highway repairs due to the use of solid tires on heavy loaded trucks.

Recent cable advices to Goodyear Tire & Rubber Co. state that the Dutch Roads Congress will meet in September to discuss details of the proposed legislation and make recommendations to the government on the matter of specifying certain pneumatic tire equipment for motor vehicles.

In Norway the legislation to become effective this summer provides that all trucks used for commercial purposes must be equipped on all four wheels with tires of at least five inch treads. This means that up to two tons, trucks must be pneumatically shod; from two to three and a half tons either pneumatic or solid equipment of more than five inch tread is permissible, while all trucks of more than three and a half tons capacity may run on solids.

It is believed that the proposed legislation for Holland will be slightly different from that of Norway in that trucks up to one ton capacity must run on pneumatic tires.

Both countries found that the trucks equipped with solid tires have caused severe disintegration of the roads and caused heavy expenditures of money for repairs.

# California Behind on Gasoline Supply

(*Continued from page* 1278)

The fuel oil situation grows proportionately serious as reserves are exhausted. California is a state without coal. Perhaps no other state in the Union is more unfortunately situated in this regard. Fuel oil has taken the place of coal, being very extensively used on railroads, on boats and in manufacture. In 12 months, when the petroleum reserves are approaching exhaustion, California will see its users of fuel oil cut off from 25,000 to 30,000 barrels per day.

The present demand for more gasoline and more kerosene on the coast is calling for the use of the Burton cracking process in gasoline distillation and while this nearly doubles the quantity of gasoline obtained from a gallon of crude it leaves practically no fuel oil, so that as gasoline supplies are increased by cracking processes fuel oil is eliminated.

The new $10,000,000 Standard Oil refinery now being built to use the Burton process, while giving more gasoline, will cut down the supply of fuel oil 30 per cent, or 20,000 barrels per day.

In view of these figures it is not surprising that a fuel crisis exists in the state. The oil companies have been advertising gasoline economy the last few weeks. In many retail gasoline stations the following poster is to be seen:

**TO THE PUBLIC**

The gasoline shortage is acute. Buy as little as possible. Use only what you must. Waste none.

**TO SERVICE STATION OPERATORS**

The gasoline shortage is serious. Conserve the supply. Waste none.

(Standard Oil Co.) California

It is estimated to-day that of the 12,000 farm tractors in California 7000 are already capable of using kerosene. There are many using gasoline and the oft-heard dispute of it being cheaper to use gasoline than kerosene is heard in California as in Kansas or Nebraska. The too conspicuous exhaust is indisputable testimony of poor combustion.

Notwithstanding the present fuel crisis there are few signs of panic. A few rice growers in the northern end of the Sacramento Valley in such centers as Marysville and Chico are worried, but it is certain that tractors or trucks will receive first supplies and that rationing of fuel by the retailers will be based on this consumption.

# L. M. Axle Company Under New Control

CLEVELAND, May 28—Control of the L. M. Axle Co., a $1,500,000 Ohio corporation, has passed into the hands of George M. Durell and W. H. Cowdrey of the American Fork & Hoe Co. The Axle company was organized by Leo Meleanowski, former designer and factory manager of the Winton company and later with the White company, to manufacture several types of axles of his design. The company has purchased a 15-acre tract in Cleveland for a factory. In addition to the making of axles it will put on the market a special automobile wheel which it is claimed is stronger than steel and lighter than wood.

### LOCKWOOD MOVES BRANCH

NEW YORK, June 2—The Lockwood Mfg. Co., makers of the Lockwood line of automobile fabrics, has moved its eastern branch office and plant from Brooklyn to Buffalo, N. Y. An export sales branch has been opened in Grand Central Palace, New York. The new Buffalo factory, 368 Massachusetts Street, will give the company more space and larger equipment than the Brooklyn plant afforded.

The western office and factory—the parent plant—remains at Seventh and Wyandotte streets, Kansas City, Mo. The Chicago sales branch will continue at 3021-23 South Michigan Avenue.

# Packard Gets Data on Truck Operation

## Awards $17,840 in Prizes for Best Results Obtained in Wide Competition

NEW YORK, May 29—Prizes amounting to $17,840 have been awarded by the judges in the truck efficiency contest conducted by the Packard Motor Car Co. The contest provided cost data on operation under all weather conditions and in all circumstances. The bulk of the prizes go to 35 drivers who made the best records in seven classes, but they also are shared by shipping clerks who handled the traffic and the accountants who kept the records.

The contest records were kept according to the National Standard truck cost system. The data submitted applied exclusively to Packard trucks and gave the company accurate and extremely valuable information regarding operating costs and efficiency. Firms which entered the competition were scattered from Maine to California and from Winnipeg to Dallas. About 58 per cent of the owners who entered stayed through to the end and 401 trucks turned in records complete enough to go to the judges.

Following are the specific objects of the contest: Saving of gasoline; conservation of time and man power; making freight cars available for long distance hauls; reducing transportation costs on short hauls; encouraging the use of cost records by truck users; proving the practical need for better roads and the benefits they will bring.

### McCOY LEAVES OLDS

LANSING, MICH., May 28—D. B. McCoy, advertising manager of Olds Motor Works, has left the service of that company and has been succeeded by Thomas O'Brien, who has been connected with the advertising department in the promotion and sales end of the truck division. McCoy came to Lansing about three years ago from the Oakland Motor Car Co. at Pontiac, and for the last year, in addition to holding the title of advertising manager, has been assistant to the sales manager. He has not determined on his future location, but will continue with the General Motors organization, it is said. O'Brien has been with the company about a year.

### HARROUN CLAIMS ADJUSTED

DETROIT, May 28—J. G. Monihan, president of Harroun Motors Corp., in a statement to the trade announces that the claim against the Government for war work amounting to $800,000 has been adjusted, and automobile production at the plant in Wayne will begin immediately. The statement says Vice-President Ray Harroun, in charge of engineering, has developed many improvements in the chassis and many engine and body refinements. The factory has not been in production for several months, and the exact date when deliveries will be commenced has not been announced.

# Price Reductions Encourage Board

## Federal Reserve Anticipates Modifications Throughout Country —Business Outlook Better

WASHINGTON, June 1—Reductions in retail prices which have occurred throughout the country have given the Federal Reserve Board encouragement in its program of deflation. The monthly review of general business and financial conditions for May reflects the sentiment of the organization. The board anticipates a "serious modification of the price level throughout the country."

While no direct mention is made of the automotive industry, the trend of prices and production as reviewed by the Board includes this branch of American business. The Board points out that it is too early in the season to judge the effect of its deflation plans. There has been "no material change in rediscount rates at Federal Reserve Banks but an effort to limit credit to essential necessities has been general."

The Board's analysis shows "that there has been no material alteration in the underlying conditions affecting the situation, there being no decided increase in the volume of production sufficient to create a more normal relationship with consumption, no substantial change in the volume of credit extended, and no greater disposition to economize and invest than heretofore."

The Atlanta district, where Governor Wellborn directs the activities of the Federal Reserve banks, reports "the peak of high prices has been reached in most lines and the tendency is downward, while there is some indication of reduction in stocks of goods." The Federal Reserve agents anticipate readjustment in economic conditions in the Chicago territory, with general reductions in prices as the chief factor. The demand for credit in the Minneapolis district is very strong and the business outlook satisfactory, although there is a disposition to be cautions.

In Kansas City, where the first flurry was felt in curtailment of credits, the Board finds "retail trade has slowed down but the general situation is regarded as one of encouragement, although more or less unsettled conditions are expected to prevail during readjustment."

### MARYSVILLE PLANTS PROGRESS

DETROIT, May 28—Directors of the Canadian Pressed Metals Co. have decided to change the name of the American corporation, which plant is being erected in Marysville, Mich., to that of the American Bushings Corp. Production in the Marysville plant is expected to begin July 1. Two additional units will be started in the summer, and practically all output, it is said, will be consumed by Michigan manufacturers.

Work on the Wills-Lee Co.'s new factory in Marysville, and the independent factories drawn to that city by the location of the automobile plant rapidly is being completed. Automobile production by Aug. 1 is promised by officials of Wills-Lee Co.

The Athol Manufacturing Co. has received sufficient steel for the construction of its main building, and work on the building is being rushed rapidly.

# Harper-Bean Output Falls Behind Schedule

LONDON, May 11 (*Special Correspondence*)—The Harper-Bean combine's monthly output schedule has been published and shows that 530 chassis made up of 220 Bean, 230 Vulcan 1½-ton trucks, and 80 Swift chassis, were built in April. The increase compared with the March figures would have been greater but for the intervention of the Easter holidays, which last about a week. The total production of chassis by this combine since the beginning of the year is 1694. At this rate per quarter the year's output will be short of 10,800, as against the 20,000 scheduled for, at the outset for the first year's output.

### PATENT ISSUED ON RIM

COLUMBUS, June 1—Chester N. Hauffe of Columbus is the inventor of a new automobile rim upon which he has secured a patent. The rim, instead of being of the usual solid type, is made in a broken circle, the joint being a combination of two arched straps, crossing at the center in a toggle joint.

# Cadillac Divisions Move to New Plant

## Engineering Department and Laboratory Already Moved— Other Sections to Follow

DETROIT, May 28—Engineering department and the experimental and research laboratory bureaus of Cadillac Motor Car Co. have begun functioning in the company's new plant, marking the first step in occupancy. A portion of the traffic department also is operating in the new plant.

The assembly building, with a floor area of 620,000 sq. ft., has been completed and rapidly is being equipped with machinery. A minute schedule has been worked out for the transfer of the various departments from the old to the new factory, in order that production may not be interrupted. Each portion of the new plant will be occupied as soon as it is in readiness, operation being continued in the old plant until the departments in the new factory are running. A part of the trim shop is being installed, and other departments connected with the final assembly are preparing to move soon.

The parts building and loading docks will be completed in a few weeks. The power plant structure is finished and the greater part of the power machinery is in place. Power will be available as soon as required by the manufacturing departments. The loading docks will have a capacity of 45 railroad cars.

## *President Deschanel Salutes Tractor*

*France is expecting such a big wheat crop this year that she hopes not to have to import any. Particular attention has been paid by the French Department of Agriculture to the equipment of farms with apparatus which would make the big crop secure. The picture was taken at the Spring plowing wheat exhibition in the Tuileries Gardens. To the president's right is J. H. Ricard, minister of agriculture*

# Morgan Takes Block of General Motors

## Will Underwrite 1,419,856 Shares of New Stock—Name Six Directors to Board

NEW YORK, June 3—The acquisition of a substantial block of General Motors Corp. new common stock by the banking house of J. P. Morgan & Co. was announced yesterday following a meeting of General Motors directors. With the combination the Morgan interests will have six directors on the General Motors board, the by-laws of the corporation being amended yesterday to permit the addition of the new representatives.

The new directors are Edward R. Stettinius of J. P. Morgan & Co., George F. Baker, Jr., vice-president of the First National Bank; Seward Prosser, president of the Bankers' Trust Co.; Owen D. Young, vice-president of the General Electric Co.; W. H. Woodin, president of the American Car & Foundry Co., and C. M. Wolley, president of the American Radiator Co. They will sit for the first time at the board meeting in July.

Morgan & Co. have arranged to underwrite 1,419,856 shares of the 3,219,856 shares of new common stock which will be offered for sale. Besides this stock the Explosives Trades, Ltd., of London, and the Canadian Explosives, Ltd., of Canada, both of which are controlled by the du Ponts, who in turn are heavily interested in General Motors, will acquire as a permanent investment $36,000,000 of the new stock, making the total to be raised through the new issue, $64,000,000.

The directors declared the following dividends, payable Aug 1: Regular quarterly of $1.50 a share on the preferred stock; $1.50 a share on the 6 per cent debenture stock; $1.75 a share on the 7 per cent debenture stock, all payable to stockholders of record as of July 5. Moreover, the regular quarterly dividend of 25 cents a share on the new no par value common stock and one-fortieth of a share of stock were declared payable to stockholders of record on July 15.

### Durant Tells of Growth

In a letter to stockholders, President W. C. Durant of General Motors says:

"The gross capital employed has increased nearly eight times in four years, and the proceeds of the sale of this new common stock will supply $64,000,000 additional. Gross sales have increased over five times, while net earnings, before Federal tax deductions, have increased six times.

"Fixed assets have increased from $15,819,851 to $153,803,642, or nearly ten times. Net current assets over current liabilities in 1915 were $31,403,478, as against $129,955,812 in 1919, an increase of over four times, while miscellaneous investments have increased from $367,184 to $56,700,204, or more than 150 times, and our entire funded debt has been paid off, except a small purchase money mortgage amounting to $150,000.

"Reserves have increased upward of $40,000,000 and our surplus account over $58,000,000, while our total capital stock liability has increased from upward of $31,000,000 to over $238,000,000, or over seven times."

The present General Motors Corp., a Delaware corporation, was organized in 1917 to take over the assets of the General Motors Company of New Jersey, which was dissolved.

The policies of the company will not be altered by the addition of the new interests. It was stated authoritatively that General Motors henceforth would push more aggressively its tractor and motor truck units, in which the new interests feel there is a great opportunity to develop profitable business.

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# Trade Commission Finds Oil Secure

WASHINGTON, June 2—There is more consolation than worry for the automotive industry in the report of the Federal Trade Commission investigation of the causes of advance in prices of gasoline, fuel oil, kerosene and other refined products. The report strongly favors the oil companies in that it sets forth in the conclusions that the price is a supply and demand price and that prices are influenced somewhat by pessimistic statements as to future supply. The belief is expressed that the oil trade is competitive.

The Mexican situation is declared to be better in 1920 than in 1919 but the psychological factors became, in this year, more important than the actual statistical position, the mental attitude of the oil trade being strongly affected on the one hand by the frequent statement that "there was an impending decline of production in the United States, which was aggravated by the sudden slump of North Texas output in the middle of 1919, and by the unfavorable development industrially and politically in Mexico in the autumn of that year."

As to the profits, it is set forth that only an investigation of all of the oil companies could determine these.

The present position of this country as to a supply of oil is declared to be safe but that "we are levying a heavy tax on natural resources." Laws to protect supply through a restriction of export of domestic crude, elimination of wasteful methods of drilling and more economical methods of utilization are suggested.

While the figures are not set forth in the conclusions, there are totals in the body of the report which set forth that there is in this country a potential supply of oil for 27 years, and that our supply is only 10 per cent of the potential supply of the world. Because the rest of the world is so upset, this country is now exporting an abnormal amount of oil and oil products, but that some day the rest of the world will have these products to spare, if we need them.

# Kansas City Banks Improve Standing

## Wholesale Ban on Automobile Paper Moderated — Wheat Movement Under Way

KANSAS CITY, MO., June 1—A return towards normal conditions is noted in the Kansas City territory with reference to automotive business. Most of the large distributers are handling receipts from factory, some with their own resources, some through loans from banks. Several of the newer distributers are, it is said, having difficulty, not having yet established credit facilities.

Wild reports have been circulated of several hundred freight cars bearing passenger cars, held up in Kansas City terminals, and of shipments back to the factories by distributers who could not finance the shipments, or who considered themselves overloaded by such shipments. These stories were greatly exaggerated.

A marked improvement in retail trade in Kansas City is reported. Some dealers say used cars are selling very well, and for cash. Other dealers report a sharp upturn in business during the past few days, new cars selling in increasing numbers each day this week. On the whole, both passenger car and truck business is slow.

In the country, the local dealer sometimes gets accommodations from his banker for handling his orders from distributer, for either passenger cars or trucks; and, in some cases, the banker turns him down—apparently the deciding factor is the condition of the banker rather than the face of the security offered. It is true that many country banks are getting into better shape, having called loans and strengthened their reserves so that they can care for customers in the motor car business.

The immediate flurry which seemed about to put a complete quietus on the automotive industry in this section, and which did stun some of the distributive factors temporarily, has passed. Bankers are looking at the matter more conservatively, and are not definitely banning motor car paper.

### Money Hard to Get

The situation has not been relieved, however; money for motor car, truck and tractor financing, both for dealer and ultimate owner, will be hard to get in this district until after the wheat movement is certainly financed. The Federal Reserve bank of this district still has about $15,000,000 rediscounted with other banks, indicating a continuance of the actual shortage of resources for handling the fundamental agricultural business of the district; and no motor car paper, it is reported, has been rediscounted by the Federal Reserve bank since April 17. As banks readjust their own lendings, however, these banks are becoming able to care for customers' interests without calling on the Federal Reserve.

# Release 2700 Cars in Texas District

## Commerce Commission Orders Immediate Unloading of Grain at Owners' Expense

WASHINGTON, May 29—Twenty-seven hundred cars loaded with grain held on Southwestern railroads have been ordered unloaded and the cars released for service at once by the Interstate Commerce Commission. The action is considered an indication of similar steps to be taken to relieve congestion in other parts of the country. In acting the commission warned shippers that they must co-operate with the Government and the railroads in breaking the traffic jam. The notice was served in the form of an order directing five railroads entering Galveston, Tex., to immediately unload the cars and restore them to service.

Although there was no official announcement by the commission that it would proceed along the same course in other cities, such suggestions have been made by railroad officials in objections to the use of freight equipment for what they describe as "public warehouses." Conditions prevailing in Galveston, railroad officials said, are duplicated in several other cities.

The railroads affected by the order today were instructed to remove the grain, said to be nearly all wheat, to railroad or public warehouses wherever accommodation could be found. The unloading and the storage will be at the expense of the owners of the shipments.

The commission's action also gave indication that shippers who order cars will be required to load them promptly and that no delay will be tolerated on the part of the shipper after the cars once are made available to him. Railroads also have complained that the holding of cars was not uncommon.

The standing committee of the Association of Railway Executives met here to-night to discuss the general traffic situation, and put in final shape the program they will lay before the commission to-morrow at the hearing to determine disposition of the revolving fund provided in the Transportation Act. They will put before the commission their detailed requirements both as to equipment, additions and improvements.

Since the Government turned the roads back to private control, three months ago, the stronger companies have placed orders for $150,000,000 of new equipment. The total equipment needs of the roads are estimated by the Association of Railway Executives at $610,000,000 for 1920, and additions and betterments are estimated to require expenditures of approximately $400,000,000 additional.

### PHILBRIN COMPANY CHANGES

PHILADELPHIA, June 2—The Philips-Brinton Co., Kennett Square, Pa., manufacturers of the Philbrin Duplex and other ignition systems, has been taken over by the Philbrin Corp., which will continue the manufacture of the Philbrin ignition system on an enlarged scale. The new company will have ample capital to carry on the greatly enlarged business and within a very short time plans to erect additional buildings to take care of the increased business. The Philbrin Corp. retains all the officers of the old company.

The Philbrin Corp. has taken over all contracts, agreements, patents, properties, obligations, etc., of the Philips-Brinton Co., the change having taken effect on June 1.

# Philadelphia Trucks to Help Out Railroads

PHILADELPHIA, June 1—The organized motor truck dealers of this city are ready to lend their assistance to the railroads in their present emergency, according to a resolution passed by the Motor Truck Association of Philadelphia.

The resolution follows:

"Resolved, That the Motor Truck Association of Philadelphia offers all of its facilities and the use of trucks owned by its members to help and assist the railroads in their present difficulty, by making deliveries and short calls for them and to assist in any other way within its power to secure immediate delivery of freight."

Copies of this resolution, which was drawn by Secretary W. H. Metcalf, were sent to Al Reeves, general manager of the National Automobile Chamber of Commerce; Harry Moock of the National Automobile Dealers Association and Napoleon Bonaparte Kelly, secretary of the Philadelphia Chamber of Commerce.

# Geisel Leaves Federal to Build Facto Truck

SPRINGFIELD, MASS., June 2—Adolf A. Geisel, who has been eastern district manager and special representative for the Federal Motor Truck Co. since 1912, has left that company to manufacture motor trucks in this city. The truck will be known as the Facto and will be built of standard units.

A factory site has been purchased facing Pecousic Boulevard and the N. Y., N. H. & H. railroad tracks. Contracts for the construction work on the factory buildings have been let and the first of these is expected to be ready for occupancy by July 1.

### DOCTORS' CARS TOTAL 150,000

NEW YORK, June 2—In a bulletin issued by the National Automobile Chamber of Commerce this week it is shown that there are over 150,000 physicians in the United States who use automobile passenger cars in making their calls. In Nevada it is shown that 159 doctors use cars to cover a territory of 696 square miles each. The territory approximately covered by each doctor in the different states descends from this figure to that of 1.4 miles covered by doctors in Rhode Island. New York, with 15,877 doctors covering an average of 3 miles each, has the greatest number of doctor-owners.

# Farmers Ask Senate for Rural Credits

## Reserve Board Deflation Methods Found Burdensome—Consumer Not Benefited Is Claim

WASHINGTON, May 28—Representatives of the Farmers' National Council appealed to-day to the Senate Banking Committee for emergency legislation setting up a temporary rural credits system to relieve farmers and cattlemen from the effects of efforts toward deflation fostered by the Federal Reserve Board. The committee was told that unless such aid was provided a great reduction in agricultural products would result with ultimate increased cost of foodstuffs to consumers.

The specific proposal was for creation of a revolving fund of $25,000,000 or more to be available for loan to farmers under Federal Farm Loan Board administration.

During the hearing and with Governor Harding of the Federal Reserve Board on the stand Senator Hitchcock, Democrat, Nebraska, joined by Senator Capper, Republican, Kansas, asserted that Governor Miller of the Kansas City Reserve Bank had put in effect a rediscount rate in connection with deflation efforts that made agriculturists pay from 9 to 10 per cent for money. The rate was higher than that imposed in other reserve districts where similar conditions prevailed, Senator Hitchcock said, and he described Governor Miller as an "opinionated" man in whose hands such power should not be placed.

Governor Harding said the rate had been recommended by the directors of the Kansas City reserve district and also by the Dallas, Tex., district.

Senator Hitchcock insisted that the same rediscount rate should apply in all banks, where the same amount of banking facilities had been engaged, a flat percentage basis being followed.

Senator Kendrick, Democrat, Wyoming, agreed with Senator Hitchcock that the Kansas City and Dallas rediscount rates had presented "a shock" to the cattle growing industry particularly. Local banks would not accept cattle paper, he said, and were calling loans on such security. He said the price of cattle on the hoof had dropped 37 per cent in the last few months, but that this was not reflected in the cost to the consumer.

### STEAMSHIP RATES INCREASE

NEW YORK, May 29—Freight rates between New York and Colombian ports have been increased 25 per cent by steamship lines operating on this route. The advance is made owing to the congestion of shipping in South American ports which resulted in sailing delays. Formerly the ships discharged their cargoes in from one to two days. Rapid growth in export trade has greatly lengthened this unloading time, preventing normal cargo movement.

# Railroad Traffic Reported Freer

## Committees Give Special Attention to Movement of Automobile Cars Toward Factories

WASHINGTON, June 2—Improvement in the distribution of freight equipment to the automotive industry has been reported to the Interstate Commerce Commission. While complaints continue to pour into the commission's offices, the statistics compiled daily by the Car Service Committee of the American Railway Association and the terminal committee show a freer movement of traffic.

The review of conditions for last week as submitted to W. C. Kendall, chairman Car Service Commission, again points out that the demand for automobile cars continues to exceed the supply. Labor disturbances and consequent congestion have contributed to delaying the movement of this type of railroad equipment.

Instructions have been issued to the committee to give special attention to this movement in order that railroads owning automobile cars may get their property returned on their lines. There has been a speedier movement of freight through the important gateways which reflects the extraordinary effort being made to provide adequate car supplies to automobile factories.

The general freight situation lines up encouragingly. Shortages continue to exist principally in Central and Western territory. The car commission has been relocating box cars from the Eastern to Southeastern and Western territory to provide substantial relief to the territories where shortages are most pronounced.

# Reynolds Adds Seven Truck Models to Line

MT. CLEMENS, MICH., May 29—A new line of trucks is being put on the market by the Reynolds Motor Truck Co. There are four solid tire sizes—1½, 2½, 3½ and 5 tons—and three pneumatic tire models—1½-2, 2½-3, and 3½ ton. Nickel steel is used for every metal part except the rear axle housing and the frame, which are carbon steel. All the models are the same design, varying only in proportion to load and power.

The trucks are completely equipped except the body. An all steel cab with drop windows is furnished. Steel wheels, hub odometer, towing hooks, spring draw-bar trailer connection, tool set and a heavy jack are included as standard equipment. The pneumatic tired models also have a power driven pump.

The motor is a four-cylinder model of different size in each of the types. Lubrication is full force feed throughout. The radiator is of the built up finned tabular core and furnished with a guard. Ignition is by an American Bosch magneto. A generator supplies the current for starting and lighting. The Stromberg carbureter is used, supplied by gravity from a 31-gal. tank under the driver's seat. The fuel system further includes an auxiliary vacuum system attached to the dash. The clutch is of the dry plate type and the transmission drive fitted with Thermoid-Hardy fabric joints.

The transmission is of the four-speed selective type, mounted as an independent unit amidships. The propeller shaft is made by the Universals Products Co. Both axles are Sheldon make. The frame is rolled channel steel and of the semi-flexible variety. Oil is used as a lubricant throughout the chassis, each bearing being fitted with the "Blooming" flusher caps. Bound-Brook graphite bronze bearings are employed wherever rotative motion takes place. Semi-elliptic springs are used front and rear.

# Zeppelin Officials Visit Plants Here

NEW YORK, June 1—Three officials of the Luftschiffbau Zeppelin Co., of Friedrichshafen, Germany, the company which constructed Zeppelin airships for the German Government, arrived in this city from Europe last week preparatory to a tour of inspection of American airplane and automotive plants. Little information concerning their visit was given out, but speculation ensued as to the possibility that the company might attempt construction in the United States.

It was stated that army and navy officials were interested in the visit and it was said further that the army had an option with the German company for the construction of a large dirigible. The visitors are Alfred Colsman, general manager and head of the company, and William E. Dorr and Otto Milatz, directors. Commander Meyerbacher, of the United States Navy, who has been studying large airship construction abroad, returned on the same vessel.

### CHANDLER NOT CURTAILING

CLEVELAND, June 2—No orders for raw material have been canceled by the Chandler Motor Car Co., according to James M. Dunlap, sales manager of the company, replying to reported curtailment. Business is at its highest peak in seven years, he said, and the company is seeking additional supplies rather than canceling any.

### CUTLER MOVES IN CHICAGO

CHICAGO, June 2—The Chicago offices of the Cutler-Hammer Mfg. Co., of Milwaukee and New York, has been removed from the Peoples Gas Building to the company's new building at 323 North Michigan Avenue. The change gives the company more space for office work and storage of stock.

### APEX TRUCKS INCREASED

GRAND RAPIDS, MICH., May 29—Prices on Apex trucks, manufactured by the Hamilton Motors Co., were advanced on June 1 as follows: Model C, 1-ton, $1,595; Model D, 1½-ton, $1,795; Model E, 2½-ton, $2,550.

# Allen to Continue Production Schedule

## Receivership Will Permit Company to Carry Out Refinancing Plan—Retain Officials

COLUMBUS, OHIO, May 29—The receivers of the Allen Motor Co. have sent a letter to the Allen dealers and distributers asking for the closest possible co-operation on their part in straightening out the affairs of the corporation. The receivers, George A. Archer and William C. Willard, have retained Charles R. Miller as general manager, H. C. Runyeon as comptroller, J. F. Richman as manufacturing manager, and R. G. Ewell as sales and advertising manager.

The receivers were given the broadest possible powers to continue the business and have decided to do so. They announce that they expect to maintain the factory's normal output.

It is announced by the receivers that the court action against the company will give opportunity to refinance on a large scale. One of the factors which made a receivership necessary at this time, they state, is the attitude of the banking interests towards the automobile industry.

In explaining the need for the refinancing plans which were under way when the company was thrown into receivership, it is stated that the decrease in the value of the dollar made more working capital necessary. Other factors were the move to Columbus and the increased production program. The company accumulated nearly $2,000,000 worth of materials and then, for various reasons, was not able to keep up its production schedule.

The receivers have made no statement as to assets and liabilities. It has been learned unofficially, however, that the merchandise liabilities will approximate $1,400,000 and the bank liabilities $600,000.

### TRAFFIC CONVENTION ON COAST

SAN FRANCISCO, June 2—The National Traffic Officers Safety First Exposition will be held in conjunction with the convention of the National Traffic Officers Association, in the San Francisco Exposition Auditorium, Aug. 23 to 27. The principal purpose of the convention is to work out a system of traffic regulation for adoption in every state. The exposition will show safety appliances. C. De Witt De Mar is manager of the exposition.

### DUNDEE FOUNDRY FORMED

DUNDEE, MICH., May 29—The Rev. M. J. Prestidge, widely known Michigan minister, has been elected president of the Dundee Foundry Co., incorporated to conduct an aluminum and brass foundry. Other officers are Dr. J. B. Haynes, vice-president; A. M. Ritter, treasurer, and Colburn Burroughs, secretary. These officers, together with Charles Post, Wade Waring, John Reum and Milo Van de Venter, compose the directorate.

## INDUSTRIAL NOTES

**Michigan Crankshaft Co.** will start some of the machinery in its new plant next week gradually expanding operations until the entire plant will be running with a crew of about 600 men within two months. Building operations on the new factory practically are completed, and the greater part of the machinery has been installed.

**Lexington Motor Co.**, Connersville, Ind., is making extensive factory improvements. A portion of the progressive assembly track already is in operation. All the buildings are of the most modern construction. A new structure will be erected for the engineering and laboratory departments which will be fully equipped in every way.

**New York.** Splitdorf Electrical Co. has transferred the New York branch, formerly located at 3 West Sixty-first Street, to the main office at 98 Warren Street, Newark, N. J. An office will be maintained in New York at 285 West Fifty-seventh Street.

**Overland Tire & Rubber Co.**, Omaha, has completed its plant and is producing 200 tires and 500 tubes daily. An overhead conveyor track makes it possible for a core to complete the circuit of the factory without touching the floor.

**Supreme Cord & Rubber Co.**, Akron, Ohio, plans the erection of a $2,000,000 factory on a 5½ acre tract purchased recently. The plant will consist of the main factory building and power plant. The site is 1,200 x 1,400 ft.

**Columbia Tire & Rubber Co.**, Columbiana, O., recently recapitalized, is building an up-to-date cord tire plant at Mansfield in addition to producing three brands of cord tires at its present factory.

**Kokomo Malleable Iron Works**, Kokomo, Ind., has been formed with a capital of $350,000 by stockholders of the Haynes Automobile Co., and the Service Motor Truck Co., to furnish both companies with malleable iron castings.

**The Bennett Injector Co.**, Muskegon, Mich., has purchased the A. J. Wood Mfg. Co., Grand Rapids, manufacturer of the Wood's no-valve grease injector. The company has started production.

**Apperson Bros. Automobile Co.** is erecting several new buildings and are enlarging some of those now in use to speed the production. New machinery and equipment also are being installed.

**Jackson Truck Hoist Co.**, Belleville, Ill., has disposed of its automobile split rim tool to the Standard Machine Co., of St. Louis, which will put the tool on the market on a large scale.

**Arnold Electric Tool Co.**, formerly of New Haven, Conn., has moved to New London. J. N. Lapointe, of the J. N. Lapointe Co., New London, is the new president of the company.

**Boston Insulated Wire & Cable Co.**, Boston, has installed wire drawing equipment in its new building and is launching a greatly extended production schedule.

**Hall H. Streuve**, inventor of a spring leaf spreader for automobiles, has organized the H. H. Streuve Mfg. Co., in Cincinnati, to manufacture the spreader.

**Thomas-Armstrong Co., Inc.**, successors to C. B. Thomas, has moved its executive offices from 1777 Broadway, New York, to the factory at Geneva, N. Y.

**Matthews Radiator Repair Co.**, Indianapolis, has moved into larger quarters at 142 West Tenth Street.

**Multibestos Co.**, Walpole, Mass., makers of Multibestos brake and clutch linings, have opened a New York branch office at 105 West Sixty-third Street.

**The Trailmobile Co.** has obtained authority from the Secretary of State to decrease its capitalization from $900,000 to $580,000.

**Buda Co.**, Harvey, Ill., has completed a foundry for casting small engine parts, in the record time of thirty days.

**Tokheim Tank & Pump Co.**, Fort Wayne, Ind., is doubling the size of its plant.

## Mixter Succeeds Jay as Pierce-Arrow Head

NEW YORK, June 2—Colonel Charles Clifton has been re-elected chairman of the board of directors of the Pierce-Arrow Motor Car Co., at an organization meeting held this week. John C. Jay, Jr., president, was elected chairman of the executive committee and Colonel George W. Mixter, who joined the organization with Jay, was named to succeed him as president.

Other officers elected were W. J. Foss, vice-president in charge of commercial matters; W. C. Pearson, secretary, and M. E. Forbes, treasurer. Walter P. Cooke, chairman of the board of the Marine Trust Co. of Buffalo, was elected a director and a member of the executive committee.

The affairs of the Pierce-Arrow company are said to be in unusually good condition. Notwithstanding the traffic situation, which has crippled many companies, Pierce-Arrow has maintained substantial production and is showing satisfactory earnings. Inventories have been materially reduced and loans are being liquidated at a rate faster than called for by due dates, the officers said.

## England Continues Ad Valorem Tax on Cars

WASHINGTON, June 1—Efforts of American commercial organizations to lift the ad valorem duty on motor cars imported to England have failed to move the British authorities. Advices received here to-day from Ambassador Davis show that the action of the Committee of the Finance Act in providing for the continuation of the duty until May, 1921, would stand. The American Chamber of Commerce in London has conducted a movement against this duty, which amounts to 33⅓ per cent on American cars.

### DIAS GETS PAIGE CONTRACT

BAHIA, BRAZIL, May 15 (*Special Correspondence*) — Arlindo Fernandes Dias has taken the contract for distribution of the State of Bahia of Paige cars and trucks. He announces that his salesroom and advertising plans will be patterned on American ideas.

### UNION TRUCK PRICES RISE

BAY CITY, MICH., May 29—Prices on Union trucks have been advanced as follows: Model F, 2½-ton, $3,150; Model H, 4-ton, $3,975.

## METAL MARKETS

**Pig Iron**—A lackadaisical feeling has come over the market for foundry iron. While some purchasing agents for automotive plants are considering the wisdom of placing orders for third quarter deliveries, they are doing so in leisurely fashion and actual buying for the present appears to be confined to light tonnages that can be forwarded at once either by auto truck or the limited rail facilities available. At the same time, the flurry in the coke market which has brought the price for that fuel up to $15, tends to make a $45 pig iron base look smaller than it would otherwise. Many blast furnaces are curtailing their already curtailed operations. All in all, the pig iron market problem narrows itself down to a question of whether there has not been even a greater shrinkage in consumption than in production.

**Iron and Steel**—Certain sheet bar rollers appear to have hit upon an entirely new wrinkle to make certain of their share of the cream that flows from the automotive industry. Although sheet bars are sheet bars, no matter to what use the sheets that are rolled from them may be put, these sellers have two prices, one of $90, when the sheet bars are to be converted into automobile sheets and one of $75, when they are to be rolled into other kinds of sheets. Some mills are seeking to make hay while the flow of raw material is precarious, by taking steel accumulated at their plants in forms for which there is no immediate demand, and converting it into sheet bar form. No distance is too great when a consumer needs a certain class of material, to send motor trucks for it. A few days ago a Hamilton, Ont., consumer carted from Philadelphia a load of clutches that had been in a jobber's warehouse. From the Youngstown district daily cavalcades of motor trucks set out with miscellaneous steel for automotive plants. The sale of 300 tons of cold finished hexagon steel bars in smaller sizes is reported to automobile makers. Reasonably early delivery was stipulated and the price 6.50c., base. For ½ to 9/16 in. rounds 10c. has been obtained and could be repeated, if the steel could be furnished at once. Automobile bolts and nuts have been advanced by some makers 10% and are difficult to get at that.

**Aluminum**—London reports are to the effect that German aluminum is beginning to play an important rôle in the market for that metal. In the trade here little credence is placed in gossip to the effect that a considerable portion of the foreign aluminum that has of late come into the United States, was of German origin. Some of it may have been Swiss. The Germans plan an annual production of 30,000 tons, but for the present it is hardly more than 1,000 tons a month.

**Tin**—Speculation abroad and the exchange situation make for a seesaw condition with the goal seemingly a 50c. level for Straits tin. For spot metal at inland points premiums are in vogue.

**Zinc**—Some of the smelteries in the Joplin district are shutting down because the market has sunk to an unprofitable level. Prime Western is offered at 7.50c., East St. Louis basis.

**Brass**—The labor situation is more critical, especially at Waterbury, where fresh outrages have taken place. Deliveries are virtually impossible.

# Automotive Financial Notes

**Goodyear Tire & Rubber Co.** directors have declared a stock dividend of 150 per cent to common stockholders of record June 14. The dividend totals $31,133,250. Approval of the sale of $10,000,000 in common stock and $20,000,000 in preferred, authorized but unissued, also was voted by the directors to obtain additional financing made necessary by the restriction of credits. With this refinancing the company will have an outstanding capital of $128,557,250. The company's business for the first six months of this year is in excess of that of the same period last year by 59 per cent and there now is in the company's treasury a surplus of $43,000,000.

**Packard Motor Car Co.** reports net profits for the first seven months of its fiscal year, beginning Sept. 1, 1919, of $4,035,369, after providing for Federal taxes, compared with net profits of $5,433,634 for the fiscal year ending Aug. 1, 1919. The earnings for the first seven months of this year are exclusive of approximately $600,000 in profits from retail subsidiaries. Packard stockholders during the last year have been increased from 1191 to 4408.

**Columbia Motors Co.** directors declared a cash dividend of 8 per cent on the company's old stock at a meeting yesterday. This is the fifth cash dividend on that stock this year. A cash dividend of 1 per cent also was ordered paid on the new stock recently distributed in the form of a 700 per cent dividend. Both dividends are payable June 30 to stockholders June 15.

**Napoleon Motors Co.,** Traverse City, Mich., has increased its capital stock from $500,000 to $2,500,000. The new stock will be divided between common and preferred. Only a small portion will be placed on the market. The business year of the company was changed to close Dec. 31 instead of the first Monday in November.

**Willys-Overland Co.** earnings in the four months ending April 30, before allowance for depreciation and Federal taxes, were in excess of $6,000,000. Net profits, after deductions, were approximately $3,600,000, practically 15 per cent more than is required to maintain dividend payments on all classes of stock.

**International Motor Truck Corp.** directors have declared dividends on its first and second preferred issues of $2.33 a share, payable July 1 to holders of record June 15. The directors announce that hereafter it is their intention to pay regular quarterly dividends at the 7 per cent rate on both issues.

**Packard Motor Car Co.** stockholders have authorized the declaration of a 50 per cent stock dividend. Directors have decided to defer this until Congress has acted upon pending legislation. A certain amount of common stock will be set aside for debentures for conversion purposes.

**Chandler Motor Co.** has declared a dividend of $2.50 a share, payable July 1 to stockholders June 15. The distribution applies also to the new shares which are to be issued as a 33⅓ per cent stock dividend June 10. This issue will increase outstanding stock to 280,000 shares.

**American Bosch Magneto Corp.** will pay a stock dividend of 20 per cent July 15 to stock of record July 3. The regular quarterly dividend of $2.50 a share will be paid July 1 to stock of record June 15. The present capital is 83,000 shares.

**Stromberg Carbureter Co.** of America in the three months ending March 31 earned $204,478 after allowance for expenses and Federal taxes. This is equal to $2.72 a share on the 15,000 shares of no par stock. This compares with $1.73 a share on 50,000 in the first quarter of 1919.

**Advance-Rumely Co.** in 1920 is expected to show an increase in production of about 50 per cent over 1919, according to reports issued from the company's office. The increase is the result of additions to the company's plants in Battle Creek, Mich., and La Porte, Ind.

**Mullins Body Corp.** earned $337,000 before Federal taxes in the four months ending April 30. This is at the rate of $1,000,000 a year and after preferred dividend requirements would be equal to $10 a share on the common stock.

**Mercer Motors Co.** reports net earnings of $152,763 before Federal taxes for the three months ended March 31. This is at the annual rate of $611,000 or better than $6 a share on the outstanding capitalization.

**Lee Rubber & Tire Corp.** reports business for the first four months of 1920 as exceeding $2,850,000, an increase of 60.5 per cent over the same period of 1919. Net earnings were $350,000, a gain of 50 per cent.

**McCord Mfg. Co., Inc.,** reports earnings before the deduction of Federal taxes for the quarter ended March 31, as $310,307. Total business for the quarter amounted to $4,166,316.

**Pennsylvania Rubber Co.** will pay the regular quarterly dividend of 1¾ per cent on preferred stock and 1½ per cent on common stock on June 30 to stock of record June 15.

**Poinsette Engineering Co.,** Newport, Ky., has been incorporated with a capital stock of $100,000 to manufacture and sell automotive machinery.

**Sure Spark Ignition Co.** has been incorporated in Wilmington, Del., with a capital of $100,000 to manufacture electrical ignition devices.

**National Motors Corp.** has been incorporated in Wilmington with a capital of $100,000 to manufacture internal combustion engines.

**Jennings Corp.** has been formed in Wilmington, Del., with a capital of $60,000 for the manufacture of carbureters, etc.

**Star Fender Corp.** has been formed in Wilmington, Del., with a capital of $250,000 to manufacture and sell fenders.

**Strongcord Tire & Rubber Co.,** Evansville, Ind., has increased its capital stock from $250,000 to $1,250,000.

## Stutz Shares Listed on New York Curb

NEW YORK, June 1—Almost two months after they were stricken from the Stock Exchange as a result of the investigation leading to the conclusion that a corner in the stock existed, the shares of the Stutz Motor Company were officially listed on the New York Curb Market Association. This action was regarded as of little importance in the Street, as transactions since they were stopped on the "big board" have been confined to the Broad Street open air market. About the only interest in the listing announcement was that it was a reminder of the existing development in which Allan A. Ryan was the leading individual figure. The number of shares listed on the curb was 120,000, the total having been increased on April 15 from 100,000 shares as a result of the declaration of a stock dividend amounting to 20,000 shares.

### *Bank Credits*

*Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, June 2—The effectiveness of the emergency powers exercised by the Interstate Commerce Commission is already seen in a measure of relief from the congestion in freight traffic.

But the most significant incident of the week's credit situation was the raising of all classes of discount rates by the New York Federal Reserve Bank, its commercial paper rate, with the exception of bankers' acceptances, being raised from 6 to 7 per cent. This action came at the close of a week of easier rates in the local market for both call and time money. Call rates ranged from 6 per cent to 7 per cent, as against 6 per cent cent to 8 per cent the previous week, while time money on regular mixed collateral was quoted at 8 per cent, as compared with 8@8½ per cent the previous week.

For the first time in several weeks there were relatively liberal offerings of time money. This action of the local Federal Reserve Bank has called for a revision of the expectation, entertained in some quarters, that the slightly easier money rates mark the beginning of a period of definitely reduced interest rates in general.

The receipt on the Pacific Coast of $22,200,000 in gold from the Far East and the release of Argentine gold held in this country, in consequence of the movement of the exchange rate in favor of the United States, are in part reflected by the gain of $13,386,000 in the gold reserve of the Federal Reserve Banks. Net deposits of the Federal Reserve Banks increased $10,061,000, total bills $20,277,000, and note circulation $21,800,000.

The volume of discounts by the New York, Boston and Cleveland banks for other Federal Reserve Banks declined $1,400,000 to a total of $144,700,000. The ratio of the combined cash reserves to net deposits and note liabilities is unchanged at 42.7 per cent. The system of progressive discount rates has been adopted by the Federal Reserve Bank of St. Louis, similar action having been taken earlier by the Federal Reserve Banks of Kansas City and Dallas.

### TO BUILD NEW STEAM CAR

DENVER, June 2—The Steam Automotive Works will build in South Denver a modern plant at a cost of $1,500,000 to turn out a line of steam cars, steam trucks, steam farm tractors, and 40-passenger steam buses.

# Men of the Industry

**N. S. Reed,** formerly truck engineer of the Paige-Detroit Motor Car Co., has joined the organization of the Hinkley Motors Corp. as consulting engineer in the sales division. Mr. Reed will work toward the adaptation of heavy-duty automotive engines to trucks, and his long experience will be of distinct advantage to truck manufacturers.

**Charles R. Newby,** for more than ten years connected with the Flanders' interests, has been made general sales manager of the Bethlehem Motors Corp. at Allentown, Pa. Newby was for a long time district manager in the northwest for the Maxwell organization.

**C. S. Putnam** has resigned as Detroit branch manager for the United States Tire Co. to become president of the new Vitrolite Construction Co., now in process of incorporation. He has been with the United States organization nine years.

**F. R. Granger,** formerly head of the service department of the Pennsylvania Rubber Co., has accepted the position of sales manager of the Fort Wayne Tire & Rubber Mfg. Co., care F. H. Williams, 1920 Spy Run Avenue, Fort Wayne, Ind.

**David H. Creider,** president of the Michigan Metal Supply Co., has sold his interests to E. H. Welker, who succeeds him as president. A. M. Welker has been elected vice-president and A. M. Morgner, secretary and treasurer.

**J. W. Allen** has been appointed export manager and national buyer representative in New York of the Service Motor Truck Co. L. H. Boydston has been appointed general manager of the Chicago branch.

**P. P. Sheeks** has been made athletic director in the recreational department of the Firestone Tire & Rubber Co.'s factories at Akron. Sheeks gave Wabash College its first undefeated football team.

**Prof. H. S. Henderson** of the New York State College of Forestry at Syracuse will do special work during the summer months in the dry kiln department of the H. H. Franklin Mfg. Co.

**R. H. Watson,** formerly with the Detroit Iron & Steel Co. as superintendent, has joined the Ford organization as general superintendent of the blast furnaces at River Rouge.

**R. J. Schuler** has resigned as director of purchases for the Detroit Gear & Machine Co. to take the presidency of the International Purchasing & Engineering Co., Detroit.

**E. A. Samels** has been appointed assistant sales manager of the F W D Automobile Co., Clintonville, Wis. He was formerly with Locomobile and Maxwell.

**Henry H. Knapp** has been elected treasurer of the United States Light & Heat Corp. of Niagara Falls, N. Y. The company manufactures storage batteries.

**Charles H. Kip** has been appointed export sales manager of the Transport Truck Co. He was formerly connected with the General Motors Export Co.

**C. E. Rowley,** for seventeen years with the Westinghouse Air Brake Co., has been made advertising manager of the Novo Engine Co.

**Paul H. Knoll** has been appointed director of purchases for the J. I. Case Plow Works Co., Racine, Wis.

**R. L. Armstrong** has been appointed manager of the Omaha branch of the Pennsylvania Rubber Co. to succeed Dan McAvoy, resigned.

**C. D. Gilpin,** for eight years with the Aluminum Castings Co., has been made works manager of all Detroit plants of that concern.

**William G. LaRock** has been made assistant to George G. Allen, purchasing agent for the Buick Motor Car Co. of Flint.

## National Chamber Sets 1921 Show Dates

NEW YORK, June 3—National passenger car show dates for New York and Chicago in 1921 were fixed yesterday by the show committee of the National Automobile Chamber of Commerce. The New York show will be held Jan. 8 to 15, and the Chicago show, Jan. 29 to Feb. 4. The committee meeting was one of a series preceding the regular annual meeting of the chamber to-day in the Hotel Commodore ballroom.

The Board of Directors met yesterday at the same place and after a careful review of the situation, there was considerable optimism as to the future. There was no effort in these meetings to belittle the difficulties that are before the industry, nor to scoff at the situation that has been passed, but the belief was expressed that the industry was to escape serious discrimination in credits and transportation and that it was gaining a better recognition as a transportation industry.

The traffic committee received reports indicating that 68,000 cars had been driven from the factories during May. This is the highest figure every reported, comparing with 61,000 during April and 48,000 during March. The Chamber will strongly urge driveaways for the rest of the year to relieve traffic conditions.

Reports were that the traffic jam in the big cities had been broken but it was emphasized that railway traffic will require much nursing for months to come.

The Motor Truck Committee recommended that no truck show be held in 1920, at least not at the time of the passenger car show. This report will go to the annual meeting for action.

The Foreign Trade committee received reports that March was the record month for automotive exports and that this trade was in thriving condition.

The Motor Fuels Committee heard the recent reports on the gasoline situation, especially the Federal Trade Commission report just made public, with considerable satisfaction. The committee is confident there will be no scarcity of gasoline for years to come but it will urge economical use and the development of other fuels where possible. Attention is called that if gasoline advances 5 cents a gallon, this means only $15 to the buyer of 300 gallons.

On credits reports indicated that there had been some discrimination against the passenger car, but that the first wave was receding. The chamber will vigorously oppose anything that savors of discrimination, while expressing a willingness to assume its part of any credit contraction. No discrimination against trucks was reported. It was reported that bank action had indicated to dealers that terms of sale credit must be limited to 12 months, as against 18 as had been the practice. This move is not regarded as a menace by the committee.

## Col. Clifton Re-elected N. A. C. C. President

NEW YORK, June 3—Col. Charles Clifton, chairman of the board of the Pierce-Arrow Motor Car Co., was re-elected president of the National Automobile Chamber of Commerce to-day. This action was taken despite the protests of Col. Clifton, who insisted that he had earned the privilege of retirement. The retirement of Hugh Chalmers as vice-president gave opportunity for the promotion of the rest of the officers' roster. These are as follows:

Roy D. Chapin, vice-president, Hudson Motor Car Co.; C. C. Hanch, second vice-president, passenger car division, Maxwell Motor Co.; Windsor T. White, third vice-president, motor truck division, White Motor Co.; A. J. Brosseau, secretary, International Motor Co.; H. H. Rice, treasurer, General Motors Truck Co.

Directors elected were: Charles Clifton (Pierce); Windsor T. White (White); Horace E. Dodge (Dodge); Harry M. Jewett (Paige), and W. C. Sills (Chevrolet).

It was said after the meeting that the automobile production was on about a 75 per cent basis, owing to transportation limitations on incoming material.

## Saxon Motors Starts New Car Production

NEW YORK, June 1—Reports that the syndicate which underwrote Saxon Motors stock had met with financial difficulties and was left with a considerable amount of stock on its hands brought forth an official statement yesterday that the syndicate had been dissolved, "all the stock having been sold." It was further said that in addition to the cash profit realized by the participants, they will receive $2 a share on the new stock which old stockholders subscribed to. C. A. Pfeffer, president, announced that the company had started the assembling of its new Duplex model and that shipments would start next week. "The company has more than $1,000,000 in cash surplus," he informed stockholders, "and has no indebtedness. Orders for cars are in excess of production for months ahead. Production schedule calls for 500 cars in June and 1000 a month thereafter. Past delay, caused by the railroad situation, is now being rapidly overcome."

# Calendar

### SHOWS

Aug. 23-27—San Francisco, National Traffic Officers' Safety First Exposition, Auditorium, C. De Witt De Mar, Manager.

Oct. 6-16—New York. Electrical Show. Grand Central Palace. George F. Parker, Manager.

Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.

### FOREIGN SHOWS

June 21-27—Sunsvall, Sweden. Automobile Exhibition. Norrland Fair.

June 26-July 25 — Commercial vehicles, tractors, camions and engines. Antwerp.

July 9-20—London, England. International Aircraft Exhibition. Olympia. The Society of British Aircraft Constructors.

Aug. 7-Sept. 15 — Motorcycles, sidecars, etc. Antwerp.

October—London. Commercial Vehicle Show, Olympia.

November—London. Passenger Car Show, Olympia

### CONTESTS

June 12—Uniontown, Pa. Speedway.

June 14—Omaha, Neb. Truck Reliability Run.

June 17—Portland, Ore. Dirt track.

June 17-18—Chicago, Inter-Club Run, Chicago Automobile Club.

June 19—Ogdensburg, N. Y. Dirt track.

July 4—Tacoma, Wash. Speedway.

July 4—Hanford, Cal. Dirt track.

July 4—Spokane, Wash. Dirt track.

July 5—Batavia, N. Y. Dirt track.

July 17 — Warren, Pa. Dirt track.

July 24—Watertown, N. Y. Dirt track.

July 31—Fulton, N. Y. Dirt track.

Aug. 7—Erie, Pa. Dirt track.

Aug. 14—Buffalo, N. Y. Dirt track.

Aug. 20-21—Middletown, N. Y. Dirt track.

Aug. 21—Johnstown City, Pa. Dirt track.

Aug. 21—Elgin, Ill. Road race, Chicago Automobile Club.

Aug. 28—Canandaigua, N. Y. Dirt track.

Aug. 27-8—Flemington, N. J. Dirt track.

August, 1920—Paris, France, Grand Prix Race. Sporting Commission Automobile Club of France.

Sept. 1—Glidden Tour—N. Y. to San Francisco.

Sept. 5 — Targa Florio Race, Sicily.

Sept. 6—Hornell, N. Y. Dirt track.

Sept. 6—Cincinnati, O. Speedway.

Sept. 6—Uniontown, Pa. Speedway.

Sept. 17-18—Syracuse, N. Y. Dirt track.

Sept. 25—Allentown, Pa. Dirt track.

Oct. 1-2—Trenton, N. J. Dirt track.

Oct. 8-9—Danbury, Conn. Dirt track.

### CONVENTIONS

June 7-10 — Indianapolis, Ind. Annual Convention of the Associated Advertising Clubs.

June 7-11 — Del Monte, Cal. Automotive Equipment Association, Directors' Meeting, 7-8; General Sessions 10-11.

June 22-25—Asbury Park, N. J. Annual meeting American Society for Testing Materials.

### S. A. E. MEETINGS

June 21-25 — Ottawa Beach, Mich. Summer Conference.

## Duesenberg Officers Locate in Indianapolis

INDIANAPOLIS, May 28—The Duesenberg Automobile & Motors Co., Inc., Indianapolis's new $5,000,000 industry, which will manufacture the Duesenberg "Eight-in-a-Row" motors and automobiles equipped with this motor, has opened offices on the fifth floor of the Lemcke Building. These offices will remain, probably, until buildings are erected.

Newton Van Zandt, president of the company, will continue to live in Logansport. He also is president of the Revere Motor Corp., and will divide his time between the Revere and the Duesenberg interests in Indianapolis.

Fred S. Duesenberg, vice-president, in charge of engineering for the company and designer of the Duesenberg motor and racing cars, will make Indianapolis his home, as will August S. Duesenberg, assistant chief engineer.

L. M. Rankin, vice-president and general manager, is in Indianapolis, coming from New York. Rankin is a motor car sales executive of wide experience. It was largely his estimate of Indianapolis, as a motor car center, which brought the factory here.

F. A. Reilley, treasurer, formerly treasurer of the Commonwealth Financial Corp., New York, already is permanently in Indianapolis. Jacob Shaeffer, formerly assistant cashier of the Mechanic's Bank, Brooklyn, is secretary of the company.

### TRACTOR APPLIANCE EXPANDS

MILWAUKEE, June 1—The Tractor Appliance Co. of New Holstein, Wis., manufacturers of the Taco governor and the Siphon air-washer, has taken over the Quick-Stop and Calumet Tractor hitches, formerly sold by the Farm Specialty Mfg. Co. of New Holstein. This gives the Tractor Appliance Co. a complete line of tractor equipment, consisting of hitches, air washers, governors and clutch locks. The following appointments are announced: P. L. Schneidler, to take charge of the Minnesota territory on governors; J. L. Suter, in charge of the eastern Missouri and southern Illinois territory; J. C. Keller, sales representative of the Taco line in South Dakota.

## Lafayette Appoints Three Distributers

INDIANAPOLIS, IND., May 29—Vice-president E. C. Howard of LaFayette Motors Co. has appointed the Cleveland-LaFayette Co. as Cleveland distributers of the LaFayette. D. L. Gardiner, formerly president of the Cleveland-Cadillac Co., will head the organization.

The LaFayette-St. Louis Motor Co., headed by W. S. Ramsey as president with W. H. Tyler as general manager, will have the distribution in St. Louis territory. Ramsey is the Nash distributer in that territory.

Atlanta distribution will be in charge of the LaFayette Distributing Co. under the management of L. L. Halle, who resigned recently as sales manager of the Atlanta-Cadillac Co. R. H. Losey, president of the company, is head of the Losey-Nash Motor Co., Nash distributers in Indiana, and the Southern-Nash Motor Co., which controls Nash distribution in the southern territory.

### CURTISS SEEKS LANDING SITE

WILMINGTON, DEL., May 31—The Curtiss Aero Motor Corporation, in connection with a summer seashore service, to include Atlantic City, N. J., is seeking a 100-acre tract on the Delaware river near Wilmington for an intermediate landing place. It is expected to carry freight, as well as passengers.

## Oakland Warehouse To Speed Production

PONTIAC, MICH., May 29—Construction of the new car storage plant for the Oakland Motor Car Co. rapidly is nearing completion, and already more than 1000 bodies temporarily are placed in the warehouse. The new warehouse is 100 x 200 ft. with four floors and a basement, giving 150,000 sq. ft., or approximately 3½ acres of floor space. Four large elevators facilitate the movement of cars and materials. The building is constructed of reinforced concrete and practically is fireproof. Windows extending around the entire four sides of each floor and six railroads running to the building afford unusually good facilities for shipping. There is to be a track and loading dock on either side running the full length of the building and four tracks at one end of the warehouse. Three shorter loading docks 18 ft. wide also are included.

The new building is to be used for storing and loading cars for shipment. The construction is planned to meet the increased demand for the company's product and to facilitate the handling of shipments both in and out of the factory.

### BUSES TO REPLACE TROLLEYS

TOLEDO, OHIO, May 28—An ordinance providing for the establishment of a municipal bus line and appropriating $2,000,000 for such system to supplant street railway service in the event of emergency will be introduced in council and submitted to the voters at the Aug. 10 primary for their approval. It was planned to introduce the ordinance Wednesday, but postponement was necessitated by the failure to adopt a name for the company, which could be presented to the council. Prompt passage of the ordinance is certain.